

Accepted refereed manuscript of:

Cronin LD & Allen J (2017) Development and initial validation of the Life Skills Scale for Sport, *Psychology of Sport and Exercise*, 28, pp. 105-119.

doi:10.1016/j.psychsport.2016.11.001

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Development and Initial Validation of the Life Skills Scale for Sport

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Abstract

Objectives: The aim of this research was to develop a measure of life skills development through sport.

Method: Four studies were conducted to develop the Life Skills Scale for Sport (LSSS).

Study 1 developed items for the scale and included 39 reviewers' assessment of content validity. Study 2 included 338 youth sport participants and used exploratory factor analysis (EFA) and descriptive statistics to reduce the number of items in the scale and explore the factor structure of each subscale and the whole scale. Study 3 included 223 youth sport participants and assessed the factor structure and reliability of the scale using confirmatory factor analysis (CFA), exploratory structural equation modeling (ESEM) and bifactor modeling. Study 4 investigated the test-retest reliability of the scale over a two-week period with 37 youth sport participants.

Results: Study 1 resulted in the development of the initial 144-item LSSS and provided content validity evidence for all items. Study 2 refined the scale to 47 items and provided preliminary evidence for the unidimensional factor structure of each subscale. Study 3 supported the factorial validity of the scale, with ESEM solutions providing the best fit and resulting in more differentiated factors. Study 4 provided evidence for the test-retest reliability of the scale.

Conclusions: Collectively, these studies provided initial evidence for the validity and reliability of the LSSS; a measure which can be used by researchers and practitioners to assess participants' perceived life skills development through sport.

Keywords: positive youth development; psychosocial development; psychosocial assets; youth sport; exploratory structural equation modeling; bifactor modeling

To succeed in our competitive and ever-changing global economy young people must develop an abundance of life skills (Gould & Carson, 2010). Such life skills are defined as the skills required to deal with the demands and challenges of everyday life (Hodge & Danish, 1999). In line with the definitions of several researchers (e.g., Cashmore, 2002; Danish, Forneris, & Wallace, 2005), we view skills as behavioral, cognitive, interpersonal, or intrapersonal competencies that can be learned, developed, and refined. Examples of life skills include teamwork, goal setting, interpersonal communication, and leadership. These ‘life’ skills can be applied to various aspects of a person’s life (e.g., schoolwork, a part time job, friendships, sport). Additionally, the World Health Organization (1999) has suggested that such life skills are important for preparing adolescents for the future and ensuring their healthy development. But where do young people develop their life skills? Research suggests that young people develop their life skills through extracurricular activities such as music, drama, and sport (Larson, 2000). According to Marsh (1992), sport has the greatest number of positive effects of any extracurricular activity. In particular, it has been proposed that the interactive, emotional, and social aspects of sport make it a promising setting for young peoples’ development (Danish, Forneris, Hodge, & Heke, 2004; Hellison, Martinek, & Walsh, 2008; Fraser-Thomas, Côté, & Deakin, 2005). As such, the development of life skills forms a key aspect of positive youth development through sport (Jones, Dunn, Holt, Sullivan, & Bloom, 2011). Positive youth development (PYD) is a general term which refers to strength-based and asset-building approaches to developmental research in which young people are viewed as ‘resources to be developed’ rather than ‘problems to be solved’ (Holt, Sehn, Spence, Newton, & Ball, 2012). Qualities and competencies such as participants’ health and well-being (King et al., 2005; Park, 2004) and their life skills development (Jones et al., 2011) are proposed to indicate or enhance PYD.

Several frameworks, models and theories have recently been applied to the area of PYD through sport. Examples include Benson and Saito's (2001) conceptual framework for youth development theory and research (Cronin & Allen, 2015), Bronfenbrenner's (1999) bioecological model of human development (Strachan, Côté, & Deakin, 2009), Bass's (1999) transformational leadership theory (Vella, Oades, & Crowe, 2013), and Ryan and Deci's (2000) self-determination theory (Inoue, Wegner, Jordan, & Funk, 2015). Common among these frameworks, models, and theories is that they include young peoples' development as an outcome variable. Furthermore, they all highlight that researchers should investigate how key aspects of the youth sport environment (e.g., the coaching climate, peer relationships) can impact young peoples' development. In particular, self-determination theory (Ryan & Deci, 2000) seems a promising theory for investigating the mechanisms by which young people develop their life skills through sport. Self-determination theory suggests that autonomy support, satisfaction of the three basic needs (autonomy, competence, and relatedness), and self-determined motivation all relate to a person's development and well-being (Ryan & Deci, 2000). Aspects of this causal sequence have been investigated extensively in relation to well-being (e.g., Standage & Gillison, 2007; Smith, Ntoumanis, & Duda, 2007) but much less attention has been given to the mechanisms of personal development. According to Hodge, Danish, and Martin's (2012) conceptual framework for life skills interventions, the basic needs of autonomy, competence, and relatedness are the underlying psychological mechanisms that contribute to personal development within all life skills programs. Nevertheless, it is important to acknowledge that life skills need to be intentionally taught (Theokas, Danish, Hodge, Heke, & Forneris, 2008) in order for the development of life skills to actually occur. To further our understanding of young people's development and explore the mechanisms that lead to PYD, a critical step is to establish valid and reliable tools to assess indicators of PYD (i.e., life skills).

As the most popular leisure activity for young people (Hansen & Larson, 2007), sport has been proposed as an ideal setting for the development of life skills. Research suggests that through sport young people develop: teamwork (Holt, 2007), goal setting (Holt, Tink, Mandigo, & Fox, 2008), time management (Fraser-Thomas & Côté, 2009), emotional skills (Brunelle, Danish, & Forneris, 2007), communication (Gould, Collins, Lauer, & Chung, 2007), social skills (Gould, Flett, & Lauer, 2012), leadership (Camiré, Trudel, & Forneris, 2009), and problem solving and decision making (Strachan, Côté, & Deakin, 2011). The majority of these studies relied on qualitative research methods (e.g., interviews) to investigate sports participants' life skills development. In fact, only two of the eight life skills listed above (goal setting and social skills) can presently be assessed using a suitable sport-specific measure – the Youth Experiences Survey for Sport (YES-S; MacDonald, Côté, Eys, & Deakin, 2012). Without the availability of alternative measures to comprehensively assess the range of life skills young people are purported to develop through sport, researchers are unable to test and refine the theories, frameworks, and models which describe, explain, and predict youth development. Furthermore, programme development and evaluation that is theoretically grounded remains limited.

Despite calls for new measures to be developed (Gould & Carson, 2008), only one sport-specific measure is currently available to assess life skills development through sport (i.e., the YES-S; MacDonald et al., 2012). This survey is an adaptation of the Youth Experience Survey 2.0 (Hansen & Larson, 2005) and measures personal and social skills, cognitive skills, goal setting, initiative, and negative experiences. Several recent studies have used the YES-S when investigating life skills development through sport (e.g., Bruner, Eys, Wilson, & Côté, 2014; Cronin & Allen, 2015; Vella, Oades, & Crowe, 2013). Nonetheless, these studies have only provided evidence for the internal consistency reliability of each subscale, with evidence of other forms of reliability and validity yet to be established.

Despite the YES-S being a promising measure, there are several other life skills that young people are purported to develop through sport.

Using content analysis, Johnston, Harwood, and Minniti (2013) identified the key assets or what others would term life skills (e.g., Danish, Petitpas, & Hale, 1992; Gould & Carson, 2008) that young people develop through sport. These life skills were: teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making. Johnston et al. (2013) analyzed 34 papers on PYD through sport and showed that these eight life skills were cited a total of 95 times across these publications. These particular life skills are important as they are related to a range of positive outcomes including: workplace productivity and success (Locke & Latham, 1984; Rubin & Morreale, 1996), academic achievement (Britton & Tesser, 1991; Humphrey et al., 2011), sport and exercise performance (Burton, Naylor, & Holliday, 2001), overall health (Claessens, van Eerde, Rutte, & Roe, 2007), and psychological well-being (Brackett & Mayer, 2003; Judge, Bono, Erez, & Locke, 2005). However, there is presently no suitable measure to comprehensively assess the development of these key life skills within sport. Therefore, our aim in developing and validating the LSSS was to provide a much needed measure to comprehensively assess the eight key life skills that young people are purported to develop through sport.

Developing such a measure would allow researchers and practitioners to further investigate whether young people are developing these life skills through sport and pave the way for theory-based research concerned with the antecedents and consequences of life skills development. As youth development is best studied longitudinally (García-Bengoechea & Johnson, 2001), the scale would allow researchers and practitioners to track young peoples' development of these life skills over time and determine the mechanisms of development. Finally, this scale would help researchers to investigate the efficacy of existing programs

148 designed to teach young people life skills through sport (e.g., Sport United to Promote
149 Education and Recreation, SUPER; Danish, 2002) and further promote the development of
150 theory-led life skills interventions.

151 Overall, the purpose of the present research was to develop a scale which could assess
152 the extent to which young people perceived they were developing the eight life skills through
153 sport. In line with previous research on PYD and life skills development through sport, this
154 survey was developed for youth sport participants in the 11–21 years age range (Holt, 2008).
155 In total, a series of four studies were conducted to develop and provide initial validity (i.e.,
156 content, factorial, convergent, and discriminant validity) and reliability (i.e., internal
157 consistency and test-retest reliability) evidence for the LSSS.

158 **Study 1 – Initial Development of the Scale**

159 The aim of this study was to create a scale to measure participants' perceived
160 development of the eight life skills within sport. This involved defining the life skills,
161 selecting components which best represented each life skill, and developing items to assess
162 the life skills. After developing the initial item pool, academics with expertise in one
163 individual life skill reviewed items related to that particular life skill. Based on experts'
164 ratings, items were selected for the initial version of the scale. A thorough approach to
165 developing the scale was important because several researchers have highlighted content
166 validity as an area which has been neglected when developing measures for sport psychology
167 (Gunnell et al., 2014; Zhu, 2012).

168 **Method and Results**

169 **Selecting Definitions and Components**

170 The first step when developing a scale is to define the construct/s being measured and
171 decide on the components which comprise the construct/s (Clark & Watson, 1995). A clear
172 definition and components should ensure that items created fit with the definition adopted

and represent all components of the construct. This is an important process as “any measure must adequately capture the specific domain of interest yet contain no extraneous content” (Hinkin, 1995, p. 969). An extensive review of literature relating to each life skill was conducted to identify how life skills and components of the life skills have been defined in theory and research. A university search engine which searches across all the major search engines (e.g., psycARTICLES, psychINFO, SPORTDiscus) was used to locate relevant journal articles. A range of search terms were used to find articles which defined the life skills and outlined their components. For example, we searched for articles using the following types of search terms in combination (e.g., teamwork and defined, teamwork and components, teamwork and scale, teamwork and questionnaire, teamwork and survey, etc.). In total, we found 103 articles which contained relevant definitions and components of the eight life skills. From these articles, a list of 22 definitions (2–3 per life skill) and 20 sets of components (2–4 per life skill) was drawn up and reviewed to establish our definition and components for the life skills. The definitions and components we selected for each life skill are outlined in Table A (see supplementary materials).

Developing Items

To help develop items, 38 measures and 34 sources of literature (e.g., journal articles and book chapters) were consulted. When writing items, we sought to create items that represented every component of the eight life skills. In line with the advice of MacKenzie, Podsakoff, and Podsakoff (2011), global items representing the overall life skill were also created (e.g., an item assessing overall teamwork skills). Similar to other scale development studies (e.g., Eys, Loughhead, Bray, & Carron, 2009), we sought to develop an item pool which would be considerably larger than the final scale. In total, we developed 452 items which represented the eight life skills. Due to the large number of items, we reviewed all items and removed items which were too vague, too lengthy, too complicated, or lacked

relevance for the target population (DeVellis, 2011). After removing items, 270 items were left representing the eight life skills and all the life skills components.

Providing Content Validity Evidence

To assess content validity evidence, a panel of experts were consulted. Due to the number of items, expert reviewers who had published at least one journal article on one particular life skill were invited to participate. In total, 202 potential reviewers were contacted and 39 reviewers participated in the item review process which was conducted using an online survey. The number of reviewers for each life skill was as follows: teamwork ($n = 4$), goal setting ($n = 7$), time management ($n = 5$), emotional skills ($n = 5$), interpersonal communication ($n = 4$), social skills ($n = 7$), leadership ($n = 5$), and problem solving and decision making ($n = 2$). Reviewers had the following professional roles: full professor ($n = 19$), associate/assistant professor ($n = 9$), professor emeritus ($n = 2$), lecturer ($n = 2$), reader ($n = 1$), associate dean ($n = 1$), dean ($n = 1$), head of department ($n = 1$), teaching assistant ($n = 1$), assessment coordinator ($n = 1$), and sport psychologist ($n = 1$). The countries where reviewers worked were: America ($n = 20$), Canada ($n = 7$), United Kingdom ($n = 5$), Australia ($n = 3$), the Netherlands ($n = 2$), Norway ($n = 1$), and Israel ($n = 1$).

Within the online survey, reviewers were told the purpose of the item review process (e.g., to develop a scale to assess the development of teamwork skills through sport) and provided with both the definition and components of the life skill. Reviewers were asked to: (a) rate each item from ‘poor’ (1) to ‘excellent’ (5) on its ability to measure the life skill, (b) select what component of the life skill the item related to, and (c) comment on the suitability of the item (e.g., item wording and clarity, suitable for the sport domain, relates more to another construct, etc.). Finally, each reviewer was asked: “Have you any other comments or suggestions for improving the scale”? This methodology for providing content validity evidence has been advocated by researchers (e.g., Beck & Gables, 2001; Haynes, Richards, &

Kubany, 1995) and used in previous sport and exercise psychology studies (e.g., Dunn, Bouffard, & Rogers, 1999; Lonsdale, Hodge, & Rose, 2008).

After the expert review process, items were selected for the initial version of the scale based on the following criteria: (1) the item must have scored well (above 3.0) on its ability to measure the life skill, (2) the majority of reviewers (above 50%) must have agreed that the item referred to a particular component of the life skill, and (3) reviewers' comments were taken into account (e.g., negative comments about an item were considered when selecting items). A 50% agreement among reviewers for retaining items has been used in previous sport and exercise psychology studies (e.g., Pope & Hall, 2014). During this process, the number of items was reduced from 270 to 144 items. The breakdown of the number of items for each life skill is contained within Table 1. Mean scores for selected subscale items on the 'poor' (1) to 'excellent' (5) reviewer rating scale were: teamwork (4.2), goal setting (3.7), time management (3.4), emotional skills (4.5), interpersonal communication (4.3), social skills (3.9), leadership (4.1), and problem solving and decision making (5.0). Of the 144 items, only four items scored below the 3.0 criteria but these items were retained to ensure adequate content coverage. Within their subscale, the frequency with which items were assigned to the correct component was as follows: teamwork (85%), goal setting (75%), time management (74%), emotional skills (83%), interpersonal communication (90%), social skills (73%), leadership (89%), and problem solving and decision making (100%). Only 10 items were assigned to the correct component less than 50% of the time, but as this was still an initial stage of scale development these items were retained to ensure content coverage. Reviewer comments such as "does not reflect any component", "will not give you much variance in responses", "too general" were also taken into account when selecting items. Specific reviewer feedback also helped to improve the wording of 23 items (e.g., "set goals so that I can stay focused" was changed to "set goals so that I can stay focused on

improving”) and led to the inclusion of one additional item. Finally, as readability is an important consideration when conducting research with younger participants, all 144 items were assessed for readability using the Flesch-Kincaid readability assessment (Harrison, 1980). Results showed that these items required a grade 4.9 reading level, which means that the average 10–11 year old would be able to read the items.

After selecting items to include within the scale, three elements of the scale had to be decided upon: (1) the directions given to respondents, (2) the item stem, and (3) the response format. The present authors - with the help of five doctoral students - decided on these three elements of the scale. The directions to be given to respondents were: “Young people have all kinds of experiences and can learn a lot from playing sport. These questions ask about the skills you may have learned through playing your chosen sport. Please answer the questions by circling the number to the right of each question. There are no right or wrong answers, so please answer as honestly as possible. Please rate how much your sport has taught you to perform the skills listed below.” The item stem decided upon was: “This sport has taught me to...” After reviewing some of the methodological literature on response scales (e.g., Hinkin, 1995), we decided on the following response scale: not at all (1), a little (2), some (3), a lot (4), and very much (5). A five-point response scale was chosen as it offered enough choice without overwhelming respondents with too many response options – an important consideration given the age range of participants (11–21 years). In his review of response scales, Cox (1980) suggested that five response options is adequate for most measures. Other measures within youth sport have also used this 1 (not at all) to 5 (very much) response format (e.g., the Sources of Enjoyment in Youth Sport Questionnaire; Wiersma, 2001).

Discussion

The purpose of Study 1 was to develop a scale which adequately assessed the life skills participants’ perceived they developed within youth sport. Informed by the

work of Johnston et al. (2013), this study developed an initial 144-item scale which assessed the eight key life skills that young people are purported to develop through sport. The expert review process outlined in this study provided content validity evidence for the items selected for the initial version of the scale. This was important as both Gunnell et al. (2014) and Zhu (2012) suggested that content validity is frequently neglected during scale development in sport and exercise psychology. Given the large number of items in the initial version of the scale, the next study used EFA and descriptive statistics to further refine the scale and assess the factor structure of each subscale and the whole scale.

Study 2 – Scale Refinement and EFA

The purpose of this study was to reduce the number of items in the LSSS to 47 items and provide initial evidence for the unidimensional factor structure of the subscales. Reducing the amount of items to a more manageable number was considered necessary so that the scale could be practically implemented by researchers and practitioners. A minimum of 47 items was needed so that every component of each life skill would be represented in the LSSS. Specifically, each life skill would have 4–8 items depending on how many components comprised the life skill. Four items was the minimum for any subscale as researchers have suggested at least four items are needed to describe a construct and ensure adequate internal consistency reliability (Watson & Clark, 1997). Providing preliminary evidence for the unidimensional structure of the subscales was important as several methodologists propose that ensuring the unidimensionality of subscales is a key aspect of developing a scale (Anderson & Gerbing, 1988; Clark & Watson, 1995; Kline, 2000; Reise, Waller, & Comrey, 2000). In sum, the focus of this study was to refine the scale further in order to develop the strongest possible measure in terms of both validity and reliability.

EFA was chosen at this stage so initial evidence for the factor structure of the subscales and the whole scale could be assessed and the number of items in the scale could be reduced prior to conducting CFA, ESEM and bifactor modeling with another sample. EFA was conducted firstly at the subscale level and later for the whole scale due to the large number of items involved ($N = 144$) and to ensure the refinement of each subscale before proceeding to CFA, ESEM and bifactor analysis. Several methodologists and researchers agree that EFA is preferable to CFA in the early stages of survey development (e.g., Brown, 2006; Kelloway, 1995). In particular, EFA is considered a useful method of data reduction when developing or refining a scale (Anderson & Gerbing, 1988; Conway & Huffcut, 2003; Floyd & Widaman, 1995), whereas model modification should be done sparingly within CFA (MacCallum, 1995). Past studies in sport psychology have used EFA to refine a scale in a similar manner (e.g., Eys et al., 2009).

Method

Participants

The sample comprised of 338 British youth sports participants ($M_{age} = 14.71$, $SD = 2.42$, age range = 11–21) who participated in a range of sports. Reviews of EFA studies across various psychology journals has shown such a sample size to be in line with other published research (Fabrigar, Wegener, MacCallum, & Strahan, 1999; Henson & Roberts, 2006). The main sports represented were football ($n = 87$), swimming ($n = 40$), dance ($n = 34$), field hockey ($n = 27$), basketball ($n = 21$), athletics ($n = 18$), golf ($n = 15$), and rugby ($n = 12$). The sample included 84 respondents who participated in 30 other sports (e.g., tennis, netball, badminton, horse riding, boxing, etc.). The sample had slightly more males ($n = 189$) than females ($n = 149$). Participants played their sport for an average of 5.34 hours per week ($SD = 4.79$) and had an average of 6.24 years ($SD = 3.93$) playing experience.

Measures

Life skills development. The 144-item LSSS was used to measure the extent to which youth sport participants perceived they were developing the eight life skills through their chosen sport. This scale asks participants to “rate how much your sport has taught you to perform the skills listed below”. Participants responded on a five-point scale ranging from 1 (*not at all*) to 5 (*very much*). Example items are contained in Table 2.

Procedures

Following approval from the university’s ethics committee, participants were recruited by contacting physical education teachers from local schools. Initial contact was made via email, telephone, or face-to-face meetings and permission to survey the school was granted. Prior to completing the scale, informed consent was obtained from either the youth sport participant or the participant’s parent or guardian if under 16 years. Participants completed the scale after the researcher gave an introductory statement which explained the purpose of the study, that there were no right or wrong answers, and that all information provided would be confidential. The scale took approximately 20–25 minutes to complete.

Data Analyses

The main purpose of the data analyses was to reduce the LSSS from 144 to 47 items and assess the factor structure of the subscales. Reducing the number of items involved two steps: (1) conducting an EFA on each subscale, and (2) examining the descriptive statistics for individual items. EFA was conducted using SPSS 19.0 (IBM Corp., 2010). Principal components analysis was used as we wanted an empirical summary of the dataset (Tabachnick & Fidell, 2007). An unrotated factor solution was specified as we sought to explore each subscale and decide how many factors were evident. Based on expert recommendations (e.g., Fabrigar et al., 1999), Kaiser’s criterion (Kaiser, 1960), the scree test (Cattell, 1966) and parallel analysis (Horn, 1965) were used when deciding the number of factors in each subscale. Additionally, the amount of variance explained, interpretability,

scientific utility, and replicability of a given factor were considered when deciding to retain a factor (Brown, 2006; Tabachnick & Fidell, 2007). Assessing the factor structure at this early stage of scale development would allow us to ensure the unidimensional structure of the life skills subscales and create additional components of the life skills if necessary.

After deciding the number of factors in each subscale, the next step was to select items for the next version of the scale. The following information was collated and used to decide on items to retain: (1) factor loadings, (2) cross-loadings, (3) mean scores, (4) standard deviations, and (5) skewness and kurtosis values. First, we selected items with the highest possible factor loading during EFA. Comrey and Lee (1992) propose that loadings greater than .71 are considered excellent, .63 very good, .55 good, .45 fair, and .32 poor. This criteria was used to help select items. Second, we chose items which did not cross-load substantially with other potential factors. Where possible, this meant selecting ‘pure’ items which are correlated highly with only one factor (Tabachnick & Fidell, 2007). Third, we selected items with a mean score closer to the mid-point (3) on the 1–5 scale. This was in line with the proposition that items convey little information if respondents simply agree with them by circling the endpoint of the response scale (Clark & Watson, 1995). Fourth, we chose items with a higher standard deviation in order to ensure variability in responses. This meant that items would have the ability to detect both high responders (i.e., those who perceive they learned ‘a lot’ about a life skill) and low responders (i.e., those who perceive they learned ‘a little’ about a life skill). Fifth, we looked to select items with values closer to zero for both skewness and kurtosis. This would help ensure that items display a normal distribution, which is a fundamental assumption of most statistical tests (Tabachnick & Fidell, 2007). In line with our overall approach, several researchers recommend using factor loadings, cross loadings, mean scores, standard deviations, skewness and kurtosis values to evaluate items when developing a scale (e.g., Clark & Watson, 1995; DeVellis, 2011;

Hinkin, 1995; MacKenzie et al., 2011; Stanton, Sinar, Balzer, & Smith, 2002).

Results

Preliminary Analyses

Prior to the main analyses, the data were screened for normality. Skewness values ranged from -1.30 to -.02 and kurtosis values ranged from -1.32 to 1.47, indicating reasonable normality (Tabachnick & Fidell, 2007). Of the 144 items in the LSSS, participants failed to respond to an average of 3.76 items ($SD = 2.32$; range = 0–11). Missing data analysis revealed no pattern to these missing values, rather the data was missing at random. As the percentage of missing data was low (2.6%), a mean substitution was performed. Mean substitution is a valid approach for dealing with missing data in a moderately sized data set (Tabachnick & Fidell, 2007).

Preliminary tests were carried out to assess the suitability of the data for EFA. Bartlett's (1937) test statistic was significant for each of the eight life skills: teamwork, $\chi^2(253) = 3,765.07, p < .001$; goal setting, $\chi^2(91) = 2,917.35, p < .001$; time management, $\chi^2(66) = 2,654.54, p < .001$; emotional skills, $\chi^2(325) = 5,430.98, p < .001$; interpersonal communication, $\chi^2(78) = 2,805.25, p < .001$; social skills, $\chi^2(153) = 3,492.07, p < .001$; leadership, $\chi^2(253) = 5,477.90, p < .001$; and problem solving and decision making, $\chi^2(105) = 3,861.38, p < .001$. The KMO measure of sampling adequacy for each of the subscales ranged from .93–.96, indicating superb sampling adequacy (Hutcheson & Sofroniou, 1999). The majority of off-diagonal elements on the anti-image covariance matrix were less than .1. Combined, these tests indicated that the correlation matrix was suitable for EFA (Dziuban & Shirkey, 1974).

EFA Results

Teamwork. The teamwork subscale had four factors with eigenvalues above 1.0 (see Table B in supplementary materials). In contrast, both the scree plot and parallel

analysis suggested retaining two factors. To aid in the interpretation of these two factors, a further oblique (direct oblimin; $\delta = 0$) rotation was performed as the factors were thought to be correlated rather than orthogonal (Conway & Huffcut, 2003). Factor one contained 11 items (e.g., “work well within a team/group” and “help build team/group spirit”) with factor loadings above .55 which is considered ‘good’ (Comrey & Lee, 1992). Factor two only contained three items with factor loadings above .55. These items were difficult to interpret as a separate teamwork factor that would have scientific utility; thus, we interpreted teamwork as involving one factor and excluded these three items from the first version of the scale.

Other seven life skills. For the other life skills, despite some eigenvalues suggesting additional factors, the scree plots and parallel analyses suggested retaining one factor only (see Table B in supplementary materials). Therefore, we interpreted goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making as each having one factor.

Item Selection Results

To aid in the selection of items, results tables containing factor loadings, cross-loadings, mean scores, standard deviations, skewness and kurtosis values were created for each of the life skills. Table C (see supplementary materials) provides an example of one of the eight tables used for comparing items. Using these results tables allowed the researchers to compare individual items for each life skill and decide on the items to retain for the first version of the scale. In total, 47 items were selected for the scale (see Table 1 for the number of items per life skill).

To investigate potential cross-loadings of these items on non-intended life skills, a further EFA with oblique (direct oblimin; $\delta = 0$) rotation was conducted on the 47 items as the factors were thought to be correlated (Conway & Huffcut, 2003). The resulting pattern

matrix can be seen in Table D. From the pattern matrix, we can see that 46 of the 47 items loaded onto their intended life skill. Only one teamwork item (“accept suggestions for improvement from others”) did not load on its intended factor and instead loaded on an unintended life skill (i.e., problem solving and decision making). However, we decided to retain this item to ensure that the ‘accepting suggestions or criticism’ component of teamwork was represented in the final scale and the content validity of the teamwork subscale was not compromised. The pattern matrix also shows that one emotional skills item (“help someone control their emotions when something bad happens”) and two problem solving items (“think carefully about a problem” and “create as many possible solutions to a problem as possible”) cross-loaded significantly on non-intended life skills. Given that these items primary factor loadings were of a higher value than their secondary factor loadings, we decided to retain both items.

Within their subscales, the factor loadings for retained items ranged from .44–.85 (see Table 2). The majority of items had ‘excellent’ factor loadings (above .71, $n = 41$) with a small number of items displaying ‘very good’ factor loadings (above .63, $n = 5$). Only one item displayed a factor loading less than .63. This item was from the teamwork subscale (“accept suggestions for improvement from others”) and displayed a factor loading of .44. As none of the other items representing the ‘accepting suggestions and criticism’ component of teamwork had higher factor loadings, we retained this item to ensure content coverage. Within the component matrix for their subscales, only 11 of the 47 items selected displayed any tendency to cross-load with other potential factors. Ten of these items had cross loadings of .30–.39 on a potential second factor. These values were considerably lower than the first factor loading and as such were not problematic. Only one item from the teamwork subscale (“accepting suggestions for improvement from others”) had a cross-loading which was higher than its first factor loading. Mean scores for the selected items ranged from 3.33

to 4.13 indicating that participants learned between ‘some’ and ‘a lot’ about the life skills. The standard deviation of the retained items ranged from .86–1.24. Both the mean scores and standard deviations indicated that the items would ensure a certain level of variability amongst responses, which would allow the survey to discriminate between high and low responders. Lastly, skewness values ranged from -1.18 to -.25 and kurtosis values ranged from -.86 to 1.55, indicating reasonable normality (Tabachnick & Fidell, 2007). With the retained items, we calculated Cronbach’s alpha coefficients for each of the eight subscales (see Table 1). All were above the .70 value deemed adequate for the psychological domain (Nunnally & Bernstein, 1994).

Discussion

It has been proposed that researchers should pay greater attention to front-end processes such as scale refinement when developing a new scale (MacKenzie et al., 2011). In keeping with this recommendation, the main purpose of Study 2 was to reduce the LSSS to a more practical number of items that had both statistical and conceptual integrity. Based on criteria recommended by several researchers (e.g., Clark & Watson, 1995; DeVellis, 2011; Hinkin, 1995; MacKenzie et al., 2011), a rigorous process of item selection guided our choice of the 47 items included in the first version of the scale. EFA helped identify items which displayed high factor loadings on a first factor and did not cross-load with other potential factors. Analysing the descriptive statistics meant that we chose items which not everyone agreed with, ensured a reasonable level of variability, and would produce a normal distribution in future studies. Combined, using both EFA and descriptive statistics ensured the best items were selected for the next version of the scale.

This second study also provided preliminary support for the factor structure and internal consistency reliability of the eight subscales and the whole scale. However, as validity is an ongoing process (DeVellis, 2011), it was important to confirm the factor

structure of each subscale and the full scale with another sample. Evidence for convergent and discriminant validity would also need to be assessed during the subsequent study.

Study 3 – CFA, ESEM & Bifactor Analysis

The aim of the third study was to assess the eight-factor structure of the 47-item LSSS. Building on the previous study, we tested the factor structure of each subscale and the whole-model using a model testing approach. For this task, another independent sample of youth sport participants completed the scale. This allowed for the assessment of factorial, convergent, and discriminant validity evidence for the LSSS. To replicate the findings of the previous study, the internal consistency reliability of each subscale was also tested.

Method

Participants

The sample included 223 British youth sports participants ($M_{age} = 15.01$, $SD = 2.81$, age range = 10–21 years). A sample size greater than 200 is considered adequate for CFA (e.g., Barrett, 2007; Brown, 2006; Myers, Ahn, & Jin, 2011) and approximates the five-year median sample size for correlational studies across the major sport and exercise psychology journals (Schweizer & Furley, 2016). It must be noted that parameters for adequate sample size have yet to be determined in relation to ESEM or bifactor analysis (Ntoumanis, Mouratidis, Ng, & Viladrich, 2015). The main sports represented in the sample were football ($n = 82$), dance ($n = 25$), swimming ($n = 22$), field hockey ($n = 16$), rugby ($n = 15$), and basketball ($n = 10$). In total, 63 respondents participated in 23 other sports (e.g., track and field, golf, horse riding, etc.). The sample comprised more males ($n = 131$) than females ($n = 92$), with participants having an average of 6.87 years ($SD = 4.08$) playing experience. Participants played their sport for an average of 5.35 hours per week ($SD = 4.08$).

Measures and Procedures

Life skills development. The 47-item LSSS refined in Study 2 was used to measure the extent to which youth sport participants perceived they were developing life skills through their chosen sport (see Table 2 for example items). Prior to collecting any data, approval was granted by the university's ethics committee. Following the same procedures for recruitment, informed consent, and questionnaire administration as Study 2, participants completed the scale in approximately 10 minutes.

Data Analyses

To begin with, CFA employing maximum likelihood estimation was conducted using Mplus (Version 7.4; Muthén & Muthén, 1998–2015). When conducting CFA, the first step was to examine each subscale for fit. After ensuring that the subscales displayed an adequate fit, a series of models were tested. The following fit indices were used to assess model fit: chi-square (χ^2), chi-square statistic divided by degrees of freedom (df), RMSEA (Stieger & Lind, 1980), CFI (Bentler, 1990), and TLI (Tucker & Lewis, 1973). Biddle, Markland, Gilbourne, Chatzisarantis, and Sparkes (2001) suggest that the principal means of assessing a good fit is a non-significant chi-square ($p > .05$). However, with a large sample size ($N > 200$), models rarely fit via the chi-square test statistic (Barrett, 2007). Consequently, Jöreskog and Sörbom (2003) have recommended that large chi-square values relative to df indicate a poor fit, and small values indicate a good fit. Researchers suggest that the chi-square value relative to df ratio should be 3:1 or lower (e.g., Tabachnick & Fidell, 2007). Hu and Bentler's (1999) criteria was used for assessing the RMSEA, CFI and TLI values. An RMSEA of equal or less than .06 indicates a close fit, less than .08 a reasonable fit, and greater than .10 a poor fit. For the CFIs and TLIs, $>.90$ indicates adequate fit and $>.95$ indicates excellent fit.

To assess convergent validity evidence, we checked to see whether items loaded significantly onto their hypothesized factor by displaying a p -value less than .01 (Anderson &

Gerbing, 1988). To evaluate discriminant validity evidence for the eight subscales, competing models where the unconstrained model was compared to a series of models where the correlation between pairs of factors was constrained to 1.00 were performed. For discriminant validity to be evident, the unconstrained models chi-square value has to be significantly less than the constrained model (cf. Anderson & Gerbing, 1988). Competing models were compared using the χ^2 difference test. This involved subtracting the χ^2 value of the constrained model from the χ^2 value of the unconstrained model, and subtracting the *df* of the constrained model from the *df* of the unconstrained model. The resulting χ^2 difference value and its associated *df* are then compared against the *Critical Values of Chi-Square* table (see Tabachnick & Fidell, 2007, p. 949). If the χ^2 difference value and its associated *df* are significant, the unconstrained model would fit the data best. It must be noted that some researchers agree with Anderson and Gerbing's (1988) method of assessing convergent and discriminant validity evidence within an overall scale (e.g., John & Benet-Martínez, 2000; Brown, 2006) whereas others disagree (e.g., Gunnell et al., 2014). Given the breadth and size of the scale (eight life skills and 47 items), we felt it was necessary to assess convergent and discriminant validity evidence within the overall scale. A similar approach has been taken by other researchers during scale development (e.g., Lonsdale, Hodge, & Rose, 2008).

When developing a scale, it is important to test other plausible models which can be compared to the fit of the original model (Jackson, Gillaspay, & Purc-Stephenson, 2009). To achieve this aim, we tested several models using the procedures outlined by Appleton, Ntoumanis, Quested, Viladrich, and Duda (2016), and Myers, Martin, Ntoumanis, Celimli, and Bartholomew (2014). We began by testing an eight-factor CFA model which allowed all eight life skills factors to correlate but restricted items to load only on their intended life skill factor. We then compared the original eight-factor CFA model to a second-order model (i.e.,

eight factors composing a higher-order factor) and a first-order model (i.e., one factor representing all 47 items).

Recent research suggests several limitations to the CFA approach. Firstly, CFA relies on the highly restrictive Independent Cluster Model (ICM), which means that items are only permitted to load on their intended factor and possible cross-loadings with other factors are restricted to zero (Tomás, Marsh, González-Romá, Valls, & Nagengast, 2014). This is problematic as items within multidimensional measures are rarely ‘pure’ indicators of only one factor (Morin, Arens, & Marsh, 2016). Another limitation of CFA is the inflated correlations between factors that result from the highly restrictive ICM-CFA model (see Asparouhov & Muthén, 2009; Tomás et al., 2014). A final limitation is that it is quite common to obtain a poor fit via CFA with no clear sources of misfit being evident (Asparouhov & Muthén, 2009).

To overcome these limitations, Asparouhov and Muthén (2009) proposed ESEM, which combines the principles of EFA (i.e., allowing for the cross loading of items) within a CFA/SEM framework (i.e., fit indices to assess model fit). Within ESEM, items load on their intended factor, loadings on non-intended factors are freely estimated at non-zero values, and the factors can be correlated (Ntoumanis et al., 2015). The ESEM approach is thought to overcome the highlighted limitations of CFA and provide a better representation of data from multidimensional scales (Morins et al., 2016). Asparouhov and Muthén (2009) maintain that ESEM is a useful approach following an initial EFA. Furthermore, the advantages of using ESEM in the development of multidimensional scales has been highlighted by recent studies in sport and exercise psychology (e.g., Appleton et al., 2016; Myers, 2013). In an extension to ESEM, research by Morin, Marsh, and colleagues (see Morin, Marsh, & Nagengast, 2013; Marsh, Morin, Parker, & Kaur, 2014; Marsh, Nagengast, & Morin, 2013) has proposed an ESEM-within-CFA model, which permits the testing of higher-order models based on ESEM

models (H-ESEM). This H-ESEM model is advantageous when testing multidimensional scales as the inclusion of a higher-order construct ensures the aforementioned cross-loadings between factors are not inflated (Morin et al., 2016).

Along with ESEM and H-ESEM, psychometric experts (e.g., Morin et al., 2016; Myers et al., 2014; Ntoumanis et al., 2015) have advocated testing the structure of multidimensional scales using a bifactor CFA model (B-CFA) and a bifactor ESEM model (B-ESEM). With bifactor models, all items in the scale are viewed as indicators of a general factor and a specific factor (Ntoumanis et al., 2015). Bifactor models should be tested when the researcher is investigating multifaceted concepts (Reise, 2012) or when investigating the presence of a single global factor (Howard, Gagné, Morin, & Forest, 2016). Using the present research as an example, the B-CFA model would allow items to load onto two factors: (1) a general life skills factor, and (2) a specific life skill factor the item relates to. With the B-CFA model, correlations between all factors are constrained to zero and all items are only permitted to load on their intended factor, with loadings on unintended factors constrained to zero. Using the B-ESEM framework, researchers can also conduct a bifactor rotation within an EFA/ESEM framework. Using the current research as an example, the B-ESEM approach would allow items to load onto a general life skills factor along with all of the specific life skills factors. With the B-ESEM model, correlations between all factors are constrained to zero, but all items are allowed to cross-load onto unintended factors.

Summarising the information presented above, we tested several competing models which included: an eight-factor CFA model, a second-order CFA model, a first-order CFA model, a B-CFA model, an ESEM model, a H-ESEM model, and a B-ESEM model. All models were tested in Mplus (Version 7.4; Muthén & Muthén, 1998–2015) based on the robust maximum likelihood (MLR) estimator. When modeling the B-CFA structure, the global and specific factors were specified as orthogonal to ensure that the interpretability of

the solution was in line with bifactor assumptions. For ESEM, a target rotation was utilized with all cross-loadings “targeted” to be close to zero and all main loadings freely estimated. A target rotation is purported to lead to better results with larger and more complicated models (Asparouhov & Muthén, 2009) as is the case with the LSSS. From the ESEM model, a H-ESEM model was estimated using ESEM-Within-CFA (Morin et al., 2013), with all eight life skills being specified as related to a higher order life skills factor. For the B-ESEM model, an orthogonal bifactor target rotation was employed when estimating the model (Reise, 2012). The eight group factors were defined from the same pattern of target and non-target factor loadings that was used in the ESEM model and all items were allowed to load onto a global life skills factor.

To compare alternative models, we adopted the procedures of Morin et al. (2016). When comparing models, similar fit is evident when changes in the CFI are $< .01$ and increases in RMSEA are $< .015$ (Chen, 2007; Cheung & Rensvold, 2002). Changes in the TLI of $< .01$ indicate a similar fit with models involving a complex structure (Marsh et al., 2009; Morin et al., 2013). We also examined the Akaike Information Criteria (AIC; Akaike, 1987), the Bayesian Information Criterion (BIC; Schwartz, 1978), and the sample size adjusted BIC (ABIC; Sclove, 1987) when comparing models. Lower values for AIC, BIC, and ABIC are indicative of better model fit (Appleton et al., 2016). Finally, after testing all models, we tested each of the eight subscales for internal consistency reliability.

Results

Preliminary Analysis

Prior to conducting the main analyses, the data were screened for normality. Skewness values ranged from -1.35 to -.30 and kurtosis values ranged from -.82 to 1.87, indicating reasonable normality (Tabachnick & Fidell, 2007). Of the 47 items, participants failed to respond to an average of 2.65 items ($SD = 2.16$; range = 0–10). Missing data

analysis revealed no pattern to these missing values, rather the data was missing at random. Consequently, a mean substitution was performed in SPSS to replace missing data.

Subscale Results

CFA results for each of the eight subscales are contained in Table 3. Seven of the eight subscales demonstrated excellent fit. Only the emotional skills subscale displayed a less than adequate fit. However, the factor loadings for this subscale did not reveal any items that were affecting model fit (see Table 2). To further investigate model fit, we separately assessed the four items that dealt with ‘my emotions’ and the four items that dealt with ‘others emotions’ to see whether a better fit could be achieved. The ‘my emotions’ subscale displayed an excellent fit, $\chi^2 = 2.49(2)$, $p = .29$, $\chi^2/df = 1.25$, RMSEA = .03, CFI = 1.00, TLI = 1.00, whereas the ‘others emotions’ subscale displayed a poor fit, $\chi^2 = 21.04$, $p < .001$, $\chi^2/df = 10.52$, RMSEA = .21, CFI = .95, TLI = .84. Therefore, we only retained the ‘my emotions’ items for the emotional skills subscale. However, we did test the ‘others emotions’ subscale across younger (10–14 years, $n = 114$) and older (15–21 years, $n = 109$) participants to investigate whether age played a role in the inadequate fit of this subscale. The ‘others emotions’ subscale displayed a poor fit with younger participants, $\chi^2 = 18.77(2)$, $p < .001$, $\chi^2/df = 9.39$, RMSEA = .27, CFI = .89, TLI = .66; whereas, it displayed a reasonable fit with older participants, $\chi^2 = 5.19(2)$, $p = .07$, $\chi^2/df = 2.60$, RMSEA = .12, CFI = .99, TLI = .95.

Model Testing Results

After removing the four ‘others emotions’ items, the full 43-item model was firstly tested using CFA. The full eight-factor model displayed an adequate fit (see Table 3). Providing evidence of convergent validity, results showed that all items loaded significantly onto their hypothesized factor when tested within the eight-factor model (see Table E of the supplementary materials). The average factor loading for the 43 items was .73, which is considered excellent (Comrey & Lee, 1992). Only one teamwork item (“accepting

suggestions for improvement from others”) had a factor loading less than .40. Analysis for discriminant validity between subscales revealed that all 28 unconstrained CFA models had significantly lower chi-square values than the constrained models, providing evidence for the discriminant validity between subscales (Anderson & Gerbing, 1988).

During the analyses, other competing models were examined. The fit indices and information criteria for these models are contained in Table 3 and the factors loadings for these models are contained in Tables E, F, and G (see supplementary materials). When tested, the first-order CFA model displayed a poor fit. This indicated that one overriding factor is not appropriate to represent all 43 life skills items. The second-order model displayed adequate results for fit, with the exception of the .89 TLI value. Given the closeness of the TFI value to Hu and Bentler’s (1999) $>.90$ criteria and keeping the complexity/size of the model in mind (Cheung & Rensvold, 2002), we felt the second-order CFA model provided a reasonable fit. Furthermore, all eight life skills factors loaded significantly onto the higher-order factor (M factor loading = .77, range = .64–.88). When tested, the B-CFA displayed an adequate model fit with the fit indices being very similar to the eight-factor and second-order CFA models. Additionally, all items loaded significantly onto the general life skills factor and their specific life skill factor. The only exception was one teamwork item which did not load on the specific teamwork factor but was retained to ensure content coverage. We also tested a series of ESEM solutions. The ESEM, H-ESEM, and B-ESEM models all displayed an adequate fit with similar fit indices across each solution. Overall, the ESEM models provided a better fit than the CFA solutions as evidenced by improved fit indices and lower AIC, BIC, and ABIC values. Both the ESEM and H-ESEM models appeared to provide the best representation of the data because they displayed the best fit indices and lowest AIC, BIC, and ABIC values when compared to all other models.

671 Along with examining fit indices and information criteria, Morin and colleagues
672 (2016) suggested that researchers should examine parameter estimates and theoretical
673 conformity of the models to guide the selection of the best model. This initially involves
674 comparing CFA and ESEM models before comparing all ESEM models (Morin et al., 2016).
675 It is suggested that an ESEM model should be preferred over a CFA model when the factor
676 correlations are substantially reduced (Marsh et al., 2009; Howard et al., 2016). In the
677 current study, the ESEM factor correlations ($M = .37$, range = .20–.56) were substantially
678 smaller than in the eight-factor CFA model ($M = .59$, range = .33–.78). Table H of the
679 supplementary materials contains a complete list of these factor correlations. An examination
680 of the ESEM parameter estimates (see Table F of the supplementary materials) revealed well
681 defined factors for the eight life skills. With the exception of one teamwork item (factor
682 loading = .10, $p = .28$), all items loaded significantly onto their intended factor, with the
683 average factor loading being .60 (range = .10–.87). Although there were several significant
684 cross-loadings, they were substantially lower than the primary factor loadings, except for the
685 one teamwork item. With the B-ESEM model, all items loaded significantly onto the general
686 factor, with the average factor loading being .57 (range = .23–.71). In contrast, 10 items
687 failed to load on their specific factor, with the average loading on specific factors being .44
688 (range = .09–.69). Of the items which failed to load on their intended factor, six items were
689 from the leadership factor, two from the social skills factor, one from interpersonal
690 communication, and one from teamwork. Cross-loadings were less evident in the B-ESEM
691 solution as compared to the ESEM solution, but the ESEM solution was still preferable as it
692 displayed more defined factors for the eight life skills (i.e., items that loaded significantly
693 onto their intended factor). With the H-ESEM model, seven of the eight lower-order factors
694 loaded significantly onto the higher-order factor with loadings ranging from .54–.77 ($M =$

.65). Only the interpersonal communication skills factor failed to load onto the higher-order factor, as it had a .16 loading ($p = .40$).

In sum, the ESEM models provided a better fit than the CFA models, albeit three of the four CFA models did provide an adequate fit. Factors were more distinctive in the ESEM model as compared to the eight-factor CFA model as evidenced by the factor correlations. Of the ESEM models, both the ESEM and H-ESEM provided a slightly better fit than the B-ESEM model. Despite some problems with one teamwork item and cross-loadings of some items, the ESEM and H-ESEM models clearly provided an adequate fit to the data.

Lastly, the internal consistency reliability for each subscale was tested (see Table 1). All alpha coefficients were above the .70 criterion suggested by Nunnally and Bernstein (1994). Mean scores for the subscales also revealed that participants perceived they were learning at least ‘some’ and at most ‘a lot’ about the eight life skills. Teamwork, interpersonal communication, social skills, and leadership were the life skills participants perceived they learned the most about.

Discussion

The main purpose of this study was to assess the factor structure of the 47-item LSSS. When tested individually, seven of the eight subscales displayed excellent factorial validity evidence. Only the emotional skills subscale displayed an inadequate fit. After removing four items dealing with ‘others emotions’ this subscale displayed an excellent fit. There may be a specific reason why the ‘others emotions’ subscale did not provide an adequate fit. Although emotional skills involve dealing with one’s own and others’ emotions (Gignac, Palmer, Manocha, & Stough, 2005), it is possible that youth sport participants as young as 11 years may be more familiar in dealing with their own emotions. This hypothesis was supported by the fact that the fit indices for the ‘others emotions’ subscale were poor for the younger sample and reasonable for the older sample. Using a larger sample size than the

present study (i.e., $n = 109$), future studies could attempt to develop an ‘others emotions’ scale with older participants who may be more knowledgeable and practiced in dealing with other peoples’ emotions.

Within Study 3, the model testing approach recommended by Jackson et al. (2009) showed that ESEM solutions were superior to CFA solutions in terms of fit indices, information criteria, and the distinctiveness of factors. Such a finding supports previous research within sport and exercise psychology (e.g., Appleton et al., 2016; Tomás et al., 2014). When comparing the various models, the ESEM and H-ESEM models fitted the data best. However, with the exception of the first-order model, it must be noted that all other models provided an adequate fit. Given the reasonable fit of all models, we would recommend that future studies continue to investigate the factor structure of the LSSS using CFA, ESEM, and bifactor models. A noteworthy result with the bifactor models was that all items (with the exception of one teamwork item) loaded onto the general life skills factor. This suggests that a general life skills factor is evident within the data and it may be appropriate to calculate a total life skills score comprising of scores for all eight life skills. However, the eight life skill factors also loaded onto a higher-order factor when tested within the second-order CFA model and H-ESEM model, with the only exception being the communication skills factor in the H-ESEM solution. Future research comparing these models is important, as future studies may seek to investigate the mechanisms that lead to overall life skills development or to the development of specific life skills – a research goal best suited to a bifactor solution.

Before proceeding, it is important to note that some general considerations in relation to ESEM and bifactor modelling should be taken into consideration when interpreting the models tested in the current study. Specifically, some key aspects of ESEM and bifactor modeling remain somewhat unexplored in the literature. For instance, issues related to

sample size and statistical power (Myers et al., 2011), the best choice of rotation (Morin & Mañano, 2011; Myers et al., 2014), and the performance of fit indices (Marsh et al., 2010) remain unclear. Furthermore, some researchers would actually debate the need for ESEM models (e.g., Herman & Pfister, 2013) and others would suggest that bifactor models are over-interpreted within the literature (Revelle & Wilt, 2013).

In sum, the current study provided evidence for the factorial validity, convergent validity, discriminant validity and internal consistency reliability of the LSSS. Such evidence is important as establishing the validity and reliability of measures is considered the first stage of the research process (Schutz, 1994). By providing validity and reliability evidence for the LSSS, we can be more assured of the accuracy of our measurement of the eight life skills and thus more confident in our research findings using the scale. However, as validity and reliability should be continually assessed (DeVellis, 2011), future studies should look to replicate such findings. A second form of reliability which has yet to be examined during the scale validation process is test-retest reliability. Therefore, the next study assessed the test-retest reliability of the scale with an independent sample of youth sport participants.

Study 4 – Test-Retest Reliability

The purpose of this study was to assess the test-retest reliability of the LSSS. Test-retest reliability is a method used to assess the temporal stability of a scale; that is, how constant scores remain from one occasion to another (DeVellis, 2011). Zhu (2012) highlighted that most scale development and validation studies in sport psychology fail to assess this form of reliability. According to Vaughn, Lee, and Kamata (2012), administering a test twice to the same set of subjects over a relatively short period of time and correlating the two measurements is the most straightforward method of assessing reliability. In the present study, a two-week test-retest analysis was performed to establish the reliability of each of the LSSS subscales. Two weeks was deemed appropriate as it was unlikely that

participants' perceptions of life skills development would change over this time. Thus, if the LSSS is a reliable measure of life skills development through sport it should produce similar scores over a two-week period.

Method

Participants

The sample included 37 British youth sports participants ($M_{age} = 18.96$, $SD = 1.25$, age range = 17–21) who completed the scale on two occasions. Participants were recruited from first year university seminars and met the criteria for being youth sport participants (i.e., between 11–21 years and currently taking part in sport). The main sports represented were football ($n = 10$), rugby ($n = 5$), athletics ($n = 5$), and field hockey ($n = 3$). In total, 14 respondents took part in 10 other sports (e.g., basketball, American football, karate, etc.). The sample included more males ($n = 24$) than females ($n = 13$), with participants having an average of 8.47 years ($SD = 3.87$) playing experience. Participants played their sport for an average of 6.00 hours per week ($SD = 3.62$).

Measures and Procedures

Life skills development. The revised 43-item LSSS was used to measure the extent to which youth sport participants perceived they were developing life skills through their chosen sport (see Table 2 for example items). Participants completed the LSSS after seminars which were two weeks apart. Before collecting any data, approval was granted by the university's ethics committee and informed consent was obtained from all participants. Participants completed the scale after the researcher gave the same introductory statement described in Study 2. The scale took 5–10 minutes to complete on each occasion and no incentive for participation was provided.

Data Analysis

Intraclass correlation coefficients were used to assess test-retest reliability. Intraclass correlation coefficients are a measure of reliability which can range from 0, indicating no reliability, to 1, indicating perfect reliability (Weir, 2005). Values above .70 provide evidence of adequate reliability (Mitchell & Jolley, 2001).

Results

The intraclass correlation coefficients in this study were all above the .70 criterion needed to provide evidence of adequate reliability: teamwork (.93), goal setting (.93), time management (.92), emotional skills (.87), interpersonal communication (.89), social skills (.86), leadership (.93), and problem solving and decision making (.82). For each life skill, participants rated themselves above 3 (*some*) and generally closer to or above 4 (*a lot*) on the 1–5 scale. The four life skills which participants perceived they learned the most about were teamwork, interpersonal communication, social skills, and leadership.

Discussion

The findings from this study provided evidence for the test-retest reliability of the LSSS over a two-week period. This was important as it demonstrates that scores obtained using the LSSS were stable over this timeframe, which provides researchers with greater confidence that the measure is accurately capturing participants' perceptions of life skills development in a consistent manner. In assessing test-retest reliability, we also addressed a common weakness of scale development and validation studies in sport psychology (Zhu, 2012). Like validity, reliability is also an ongoing process (DeVellis, 2011) and, as such, future studies should assess the test-retest reliability of the LSSS over different periods of time (e.g., 1–6 weeks) and with younger participants.

Overall Discussion

The purpose of the present research was to develop a scale to comprehensively assess participants' perceptions of life skills development through sport. The studies described led

to the development of the 43-item LSSS, which measures teamwork, goal setting, time management, emotional skills, interpersonal communication, social skills, leadership, and problem solving and decision making. These are the most frequently cited life skills which young people are purported to develop through sport (Johnston et al., 2013). Four separate studies provided evidence for the construct validity of the LSSS. Using 39 expert reviewers, Study 1 provided evidence for the content validity of items selected for the initial version of the scale. Study 2 provided evidence for the unidimensional factor structure of the LSSS subscales and refined the scale to 47 items using EFA and descriptive statistics. Study 3 led to the reduction of the scale to 43 items and provided evidence for the factorial, convergent and discriminant validity of the subscales. The model testing approach utilized in this study suggested that ESEM solutions, particularly ESEM and H-ESEM models, best represented the data. Using a sample of youth sport participants, Study 4 provided evidence for the test-retest reliability of the scale over a two-week period. Finally, Studies 2–4 provided evidence for the internal consistency reliability of the LSSS subscales.

The studies in this research paper followed a rigorous process of scale development and validation which was guided by ‘best practice’ recommendations (e.g., DeVellis, 2011). Addressing the concerns of Zhu (2012) and Gunnell et al. (2014), this research provided evidence for both the content validity of items and the test-retest reliability of the subscales. Such a thorough approach to scale development and validation cannot be underestimated, as providing both validity and reliability evidence are the cornerstones of accurate measurement in psychology. As Schutz (1994) suggested, ensuring scales are both valid and reliable should be the first stage of the research process. Without establishing validity and reliability evidence for a measure, we cannot study the construct/s in question with any scientific validity. Validity and reliability evidence from the present research suggests that researchers who use the LSSS can be confident in the accuracy of the scores they obtain, the relationships

they find with other variables, their interpretation of such relationships, and the implications for both coaches and participants.

Having established the validity and reliability of the LSSS, the findings from studies 2–4 also demonstrate that British youth sport participants perceive they are developing a range of life skills through sport. Consistently, these studies indicated that participants perceived they learned between ‘some’ and ‘a lot’ about the eight life skills. Such findings support research with athletes, coaches, and parents which has shown that American (Gould et al., 2007, 2012), Canadian (Brunelle et al., 2007; Camiré et al., 2009; Fraser-Thomas & Côté, 2009; Holt, 2007; Holt et al., 2008; Strachan, Côté, & Deakin, 2011) and Australian (Vella et al., 2013) participants are developing these life skills through sport. From the current research, one could conclude that British youth sport participants perceived they learned the most about teamwork, interpersonal communication, social skills, and leadership, whereas they perceived they learned less about emotional skills, goal setting, problem solving and decision making, and time management. This novel finding suggests that young people perceive they learn more about certain life skills as compared to other life skills when participating in sport. Future research could illuminate the matter further by investigating possible differences in perceived life skills development across sports (team versus individual), gender (male versus female), and age groups (younger versus older participants).

From a theoretical standpoint, the LSSS will allow researchers to test various theories, models, and conceptual frameworks that can explain the processes involved in youth development through sport. In line with recent research (e.g., Cronin & Allen, 2015; Inoue et al., 2015; Strachan et al., 2009; Vella et al., 2013), self-determination theory (Ryan & Deci, 2000), transformational leadership theory (Bass, 1999), the bioecological model of human development (Bronfenbrenner, 1999), along with Benson and Saito’s (2001) conceptual framework for youth development theory and research, could all be tested using the LSSS as

an outcome variable. With self-determination theory (Ryan & Deci, 2000), the following causal sequence could be investigated: coach autonomy support – basic need satisfaction – self-determined motivation – life skills development. Similar causal sequences have been tested previously with well-being measures such as self-esteem, positive affect, and life satisfaction as outcome variables (e.g., Standage & Gillison, 2007; Smith, Ntoumanis, & Duda, 2007). However, self-determination theory's (Ryan & Deci, 2000) predictions about personal development have never been thoroughly tested using a life skills development perspective. The LSSS and self-determination theory combined provide the opportunity to begin examining the social/environmental determinants and underlying psychological mechanisms of development within youth sport. Through theory testing, researchers could provide coaches, sports administrators, and parents with theory-based evidence, explanations, and predictions on how they can promote young peoples' life skills development.

Limitations and Future Directions

Although the majority of evidence from Studies 1–4 supports the validity and reliability of the LSSS, it is important to re-emphasize that validity and reliability are considered ongoing processes (DeVellis, 2011). Thus, future studies should provide further evidence for the validity and reliability of the scale. Addressing the limitations of the current research, the LSSS should be examined in other countries/cultures and the measurement invariance of the scale should be tested across competitive levels (recreational and elite athletes), gender (males and females), sport type (individual and team sports), and time. We would also encourage future research to assess the temporal stability of the LSSS over time and with different populations (e.g., younger participants than used in Study 4). In the short term (2–6 weeks), young peoples' perceptions of life skills development through sport would not be expected to change; whereas, in the long term (1–5 years) one would expect that young peoples' perceptions of life skills development may increase. Addressing a weakness

894 of the present research, future studies should also provide evidence for the predictive validity
895 or nomological validity of the scale. One way this could be achieved is by testing the scale in
896 relation to the casual sequence of self-determination theory outlined earlier. Replicating the
897 findings of the current research, future studies should provide evidence for the factor
898 structure and internal consistency reliability of the LSSS. Through further assessment of the
899 psychometric properties of the scale, the validity and reliability of the LSSS can be
900 continually assessed, critiqued and improved (DeVellis, 2011). In this regard, future studies
901 could develop an alternative item to assess the ‘accepting suggestions or criticism’
902 component of teamwork. The item representing this component of teamwork (i.e., “accept
903 suggestions for improvement from others”) was the only item which proved problematic
904 across studies 2–3. This may have been due to the fact that this item displayed a lower
905 standard deviation (average $SD = .75$) than other teamwork items (average $SD = 1.00$) across
906 all studies. According to Clark and Watson (1995), items with poor variability are likely to
907 correlate weakly with other items and perform poorly during structural analysis. A final
908 limitation of the present research is the fact that the LSSS relies on participants’ perceptions
909 of whether they developed the eight life skills through their chosen sport. With any self-
910 report measure there are always concerns with memory recall, social desirability and the
911 truthfulness of responses (Brenner & DeLamater, 2014). Thus, we would encourage future
912 studies to gain others’ perspectives on participant’s life skills development (e.g., parents,
913 coaches, and independent observers) as well as using self-report. Gaining multiple
914 perspectives - including the participants themselves - will provide more compelling evidence
915 that participants’ are developing the eight life skills through sport. In addition, future
916 research could also create knowledge tests or behavioural ratings scales to assess the
917 development of these life skills (Goudas, 2010).

Despite requiring further validity and reliability evidence, the scale developed in the current series of studies provides a useful measure of life skills development through sport. In addition to theory testing, future studies could assess whether participants perceive they learn certain life skills in particular sports. For instance, it could be proposed due to the nature of sports (e.g., team versus individual) that a rugby player would learn more teamwork skills than a golfer, whereas a golfer may learn more problem solving and decision making skills. Such information could help market sports as venues where young people can develop their life skills and further persuade parents to involve their children in sport. Researchers could also use the LSSS to examine the efficacy of existing programs designed to teach young people life skills through sport (e.g., SUPER; Danish, 2002). Given that the SUPER program's content includes teamwork, goal setting, emotional skills, communication, and problem solving, the LSSS is an ideal measure to assess this program. For instance, researchers could use post-test ratings and retrospective pre-test ratings to mitigate against the 'response-shift bias' (Howard, 1982) and accurately assess the effectiveness of this program. Future studies should also track participants' perceived life skills development to investigate changes that occur over time, why and how these changes occur, and to assess the long-term impact of sports participation. Finally, the LSSS could be adapted to assess life skills in other domains such as physical education and other extracurricular activities. This would enable researchers to compare and contrast young people's development across the range of activities they engage in.

In conclusion, the studies in this paper provided initial evidence for the validity and reliability of the LSSS. Using this scale, researchers can thoroughly assess the degree to which youth sport participants perceive they are developing these eight life skills across sports, competitive levels, and coaching environments. Researchers can also use the LSSS to test theories investigating the mechanisms that lead to life skills development and the

943 consequences of life skills development (e.g., transfer of life skills to other settings).
944 Practitioners could use the scale to examine whether their efforts to develop these life skills
945 in young people are effective or not. Ultimately, it is hoped that the LSSS proves a useful
946 tool for researchers and practitioners interested in the promotion of PYD through sport.

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References

- Akaike, H. (1987). Factor analysis and AIC. *Psychometrika*, 52, 317–332.
doi: 10.1007/BF02294359
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411–423.
doi:10.1037/0033-2909.103.3.411
- Appleton, P. R., Ntoumanis, N., Quested, E., Viladrich, C., & Duda, J. L. (2016). Initial validation of the coach-created Empowering and Disempowering Motivational Climate Questionnaire (EDMCQ-C). *Psychology of Sport and Exercise*, 22, 53–65.
doi:10.1016/j.psychsport.2015.05.008
- Asparouhov, T., & Muthén, B. O. (2009). Exploratory structural equation modeling. *Structural Equation Modeling*, 16, 397–438. doi:10.1080/10705510903008204
- Barrett, P. (2007). Structural equation modeling: Adjudging model fit. *Personality and Individual Differences*, 42, 815–824. doi:10.1016/j.paid.2006.09.018
- Bartlett, M. S. (1937). Properties of sufficiency and statistical tests. *Proceedings of the Royal Society of London, Series A*, 160(901), 268–282. doi:10.1098/rspa.1937.0109
- Bass, B. M. (1999). Two decades of research and development in transformational leadership. *European Journal of Work and Organizational Psychology*, 8(1), 9–32.
doi:10.1080/135943299398410
- Beck, C. T., & Gable, R. K. (2001). Ensuring content validity: An illustration of the process. *Journal of Nursing Measurement*, 9, 201–215. PMID:11696942
- Benson, P. L., & Saito, R. N. (2001). The scientific foundations of youth development. In P. L. Benson & K. J. Pittman (Eds.), *Trends in youth development: Visions, Realities and Challenges* (pp. 135–154). Norwell, MA: Kluwer Academic. doi:10.1007/978-1-4615-1459-6_5

- 993 Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*,
994 103, 411–423. doi:10.1037/0033-2909.107.2.238
- 995 Biddle, S. J., Markland, D., Gilbourne, D., Chatzisarantis, N. L., & Sparkes, A. (2001).
996 Research methods in sport and exercise psychology: Quantitative and qualitative
997 issues. *Journal of Sports Sciences*, 19, 777–809. doi:10.1080/026404101317015438
- 998 Brackett, M. A., & Mayer, J. D. (2003). Convergent, discriminant, and incremental validity
999 of competing measures of emotional intelligence. *Personality and Social Psychology*
1000 *Bulletin*, 29(9), 1147–1158. doi:1177/0146167203254596
- 1001 Brenner, P. S., & DeLamater, J. D. (2014). Social desirability bias in self-reports of physical
1002 activity: Is an exercise identity the culprit? *Social Indicators Research*, 117(2), 489–
1003 504. doi:10.1007/s11205-013-0359-y
- 1004 Britton, B. K., & Tesser, A. (1991). Effects of time-management practices on college grades.
1005 *Journal of Educational Psychology*, 83(3), 405–410. doi:10.1037/0022-0663.83.3.405
- 1006 Bronfenbrenner, U. (1999). Environments in developmental perspective: Theoretical and
1007 operational models. In S. L. Friedman & T. D. Wachs (Eds.), *Measuring environment*
1008 *across the life span: Emerging methods and concepts* (pp. 3–28). Washington DC:
1009 American Psychological Association. doi:10.1037/10317-001
- 1010 Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York, NY:
1011 Guilford Press. doi:10.1080/00036810600603377
- 1012 Brunelle, J., Danish, S. J., & Forneris, T. (2007). The impact of a sport-based life skill
1013 program on adolescent prosocial values. *Applied Developmental Science*, 11(1), 43–
1014 55. doi:10.1080/10888690709336722
- 1015 Bruner, M. W., Eys, M. A., Wilson, K. S., & Côté, J. (2014). Group cohesion and positive
1016 youth development in team sport athletes. *Sport, Exercise, and Performance*
1017 *Psychology*, 3(4), 219–227. doi:10.1037/spy0000017

- 1018 Burton, D., Naylor, S., & Holliday, B. (2001). Goal setting in sport: Investigating the goal
1019 effectiveness paradox. In R. Singer, H. Hausenblas, & C. Janelle (Eds.), *Handbook of*
1020 *sport psychology* (2nd ed., pp. 497–528). New York, NY: Wiley.
- 1021 Camiré, M., Trudel, P., & Forneris, T. (2009). High school athletes' perspectives on support,
1022 communication, negotiation and life skill development. *Qualitative Research in Sport*
1023 *and Exercise, 1*(1), 72–88. doi: 10.1080/19398440802673275
- 1024 Cashmore, E. (2008). *Sport and exercise psychology: The key concepts* (2nd ed.). London,
1025 UK: Routledge. PMCID:PMC2442434
- 1026 Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral*
1027 *Research, 1*, 629–637. doi:10.1207/s15327906mbr0102_10
- 1028 Chen, F. F. (2007). Sensitivity of goodness of fit indices to lack of measurement invariance.
1029 *Structural Equation Modeling, 14*, 464–504. doi:10.1080/10705510701301834
- 1030 Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing
1031 measurement invariance. *Structural Equation Modeling, 9*(2), 233–255.
1032 doi:10.1207/S15328007SEM0902_5
- 1033 Claessens, B. J., van Eerde, W., Rutte, C. G., & Roe, R. A. (2007). A review of time
1034 management literature. *Personnel Review, 36*(2), 255–276.
1035 doi:10.1108/00483480710726136
- 1036 Clark, L. E., & Watson, D. (1995). Constructing validity: Basic issues in objective scale
1037 development. *Psychological Assessment, 7*(3), 309–319. doi:10.1037/1040-
1038 3590.7.3.309
- 1039 Comrey, A. L., & Lee, H. B. (1992). *A first course in factor analysis* (2nd ed.). Hillsdale, NJ:
1040 Erlbaum. PMid:11639968

- 1041 Conway, J. M., & Huffcutt, A. I. (2003). A review and evaluation of exploratory factor
1042 analysis practices in organizational research. *Organizational Research Methods*, 6(2),
1043 147–168. doi:10.1177/1094428103251541
- 1044 Cox, E. P. (1980). The optimal number of response alternatives for a scale: A review. *Journal*
1045 *of Marketing Research*, 27, 407–422.
- 1046 Cronin, L. D., & Allen, J. (2015). Developmental experiences and well-being in sport: The
1047 importance of the coaching climate. *The Sport Psychologist*, 29, 62–71.
1048 doi:10.1123/tsp.2014-0045
- 1049 Danish, S. J. (2002). *SUPER (Sports United to Promote Education and Recreation) program*
1050 *leader manual and student activity book* (3rd ed.). Richmond, VA: Virginia
1051 Commonwealth University.
- 1052 Danish, S. J., Forneris, T., Hodge, K., & Heke, I. (2004). Enhancing youth development
1053 through sport. *World Leisure*, 3, 38–49. doi:10.1080/04419057.2004.9674365
- 1054 Danish, S. J., Forneris, T., & Wallace, I. (2005). Sport-based life skills programming in the
1055 schools. *Journal of Applied School Psychology*, 21(2), 41–62.
1056 doi:10.1300/J370v21n02_04
- 1057 Danish, S. J., Petitpas, A. J., & Hale, B. D. (1992). A developmental-educational intervention
1058 model of sport psychology. *The Sport Psychologist*, 6, 403–415.
1059 doi:10.1123/tsp.6.4.403
- 1060 DeVellis, R. F. (2011). *Scale development: Theory and applications* (Vol. 26). London, UK:
1061 Sage.
- 1062 Dunn, J. G., Bouffard, M., & Rogers, W. T. (1999). Assessing item content-relevance in sport
1063 psychology scale-construction research: Issues and recommendations. *Measurement*
1064 *in Physical Education and Exercise Science*, 3(1), 15–36.
1065 doi:10.1207/s15327841mpee0301_2

- 1066 Dziuban, C. D., & Shirkey, E. S. (1974). When is a correlation matrix appropriate for factor
1067 analysis? Some decision rules. *Psychological Bulletin*, 81, 358–361.
1068 doi:10.1037/h0036316
- 1069 Eys, M. A., Loughead, T. M., Bray, S. R., & Carron, A. V. (2009). Development of a
1070 cohesion questionnaire for youth: The youth sport environment questionnaire. *Journal*
1071 *of Sport & Exercise Psychology*, 31, 390–408. PMid:19799000
- 1072 Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the
1073 use of exploratory factor analysis in psychological research. *Psychological Methods*,
1074 4, 272–299. doi:10.1037/1082-989X.4.3.272
- 1075 Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of
1076 clinical assessment instruments. *Psychological Assessment*, 7(3), 286–299.
1077 doi:10.1037/1040-3590.7.3.286
- 1078 Fraser-Thomas, J., & Côté, J. (2009). Understanding adolescents' positive and negative
1079 developmental experiences in sport. *The Sport Psychologist*, 23, 3–23.
1080 doi:10.1123/tsp.23.1.3
- 1081 Fraser-Thomas, J. L., Côté, J., & Deakin, J. (2005). Youth sport programs: An avenue to
1082 foster positive youth development. *Physical Education and Sport Pedagogy*, 10(1),
1083 19–40. doi:10.1080/1740898042000334890
- 1084 García-Bengoechea, E., & Johnson, G. M. (2001). Ecological systems theory and children's
1085 development in sport: Toward a process-person-context-time research paradigm.
1086 *Avante*, 7, 20–31.
- 1087 Gignac, G. E., Palmer, B. R., Manocha, R., & Stough, C. (2005). An examination of the
1088 factor structure of the Schutte self-report emotional intelligence (SSREI) scale via
1089 confirmatory factor analysis. *Personality and Individual Differences*, 39, 1029–1042.
1090 doi:10.1016/j.paid.2005.03.014

- 1091 Goudas, M. (2010). Prologue: A review of life skills teaching in sport and physical education.
1092 *Hellenic Journal of Psychology*, 7, 241–258.
- 1093 Gould, D., & Carson, S. (2008). Life skills development through sport: Current status and
1094 future directions. *Sport & Exercise Psychology Review*, 1, 58–78.
1095 doi:10.1080/17509840701834573
- 1096 Gould, D., & Carson, S. (2010). The relationship between perceived coaching behaviours and
1097 developmental benefits of high school sports participation. *Hellenic Journal of*
1098 *Psychology*, 7, 298–314.
- 1099 Gould, D., Collins, K., Lauer, L., & Chung, Y. (2007). Coaching life skills through football:
1100 A study of award winning high school coaches. *Journal of Applied Sport Psychology*,
1101 19(1), 16–37. doi:10.1080/10413200601113786
- 1102 Gould, D., Flett, R., & Lauer, L. (2012). The relationship between psychosocial
1103 developmental and the sports climate experienced by underserved youth. *Psychology*
1104 *of Sport and Exercise*, 13(1), 80–87. doi:10.1016/j.psychsport.2011.07.005
- 1105 Gunnell, K. E., Schellenberg, B. J., Wilson, P. M., Crocker, P. R., Mack, D. E., & Zumbo, B.
1106 D. (2014). A review of validity evidence presented in the Journal of Sport & Exercise
1107 Psychology (2002–2012): Misconceptions and recommendations for validation
1108 research. In B. D. Zumbo & E. K. Chan (Eds.), *Validity and validation in social,*
1109 *behavioral, and health sciences. Social Indicators Research Series 54* (pp. 137–156).
1110 Switzerland: Springer. doi:10.1007/978-3-319-07794-9_8
- 1111 Hansen, D. M., & Larson, R. W. (2005). *The Youth Experience Survey 2.0: Instrument*
1112 *revisions and validity testing*. Unpublished manuscript, University of Illinois at
1113 Urbana-Champaign, Illinois.
- 1114

- 1115 Hansen, D. M., & Larson, R. W. (2007). Amplifiers of developmental and negative
1116 experiences in organized activities: Dosage, motivation, lead roles, and adult-youth
1117 ratios. *Journal of Applied Developmental Psychology*, 28, 360–374.
1118 doi:10.1016/j.appdev.2007.04.006
- 1119 Haynes, S. N., Richard, D., & Kubany, E. S. (1995). Content validity in psychological
1120 assessment: A functional approach to concepts and methods. *Psychological*
1121 *Assessment*, 7(3), 238–247. doi:10.1037/1040-3590.7.3.238
- 1122 Harrison, C. (1980). *Readability in the classroom*. Cambridge, UK: Cambridge University
1123 Press.
- 1124 Hellison, D., Martinek, T., & Walsh, D. (2008). Sport and responsible leadership among
1125 youth. In N. L. Holt (Ed.), *Positive youth development through sport* (pp. 49–60).
1126 New York, NY: Routledge.
- 1127 Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published
1128 research: Common errors and some comment on improved practice. *Educational and*
1129 *Psychological Measurement*, 66(3), 393–416. doi:10.1177/0013164405282485
- 1130 Herman, A. and Pfister, H-R. (2013). Simple measures and complex structures: Is it worth
1131 employing a more complex model of personality in Big Five inventories? *Journal of*
1132 *Research in Personality*, 47, 599–608. doi: 10.1016/j.jrp.2013.05.004
- 1133 Hinkin, T. R. (1995). A review of scale development practices in the study of organizations.
1134 *Journal of Management*, 21(5), 967–988. doi:10.1177/014920639502100509
- 1135 Hodge, K., & Danish, S. (1999). Promoting life skills for adolescent males through sport. In
1136 A. M. Horne & M. S. Kiselica (Eds.), *Handbook of counseling boys and adolescent*
1137 *males: A practitioner's guide* (pp. 55–71). Thousand Oaks, CA: Sage.
1138 doi:10.4135/9781452220390.n4

- 1139 Hodge, K., Danish, S., & Martin, J. (2012). Developing a conceptual framework for life skills
1140 interventions. *The Counseling Psychologist*, 41(8), 1125–1152.
1141 doi:10.1177/0011000012462073
- 1142 Holt, N. L. (2007). An ethnographic study of positive youth development on a high school
1143 soccer team. Paper presented at Society for Research in Child Development
1144 conference, Boston, MA.
- 1145 Holt, N. L. (2008). Introduction: Positive youth development through sport. In N. L. Holt
1146 (Ed.), *Positive youth development through sport* (pp. 1–5). New York, NY:
1147 Routledge. PMid:17943489
- 1148 Holt, N. L., Sehn, Z. L., Spence, J. C., Newton, A. S., & Ball, G. D. (2012). Physical
1149 education and sport programs at an inner city school: Exploring possibilities for
1150 positive youth development. *Physical Education and Sport Pedagogy*, 17(1), 97–113.
1151 doi:10.1080/17408989.2010.548062
- 1152 Holt, N. L., Tink, L. N., Mandigo, J. L., & Fox, K. R. (2008). Do youth learn life skills
1153 through their involvement in high school sport? A case study. *Canadian Journal of*
1154 *Education*, 31(2), 281–304.
- 1155 Horn, J. (1965). A rationale and test for the number of factors in factor analysis.
1156 *Psychometrika*, 30(2), 179–185. doi:10.1007/BF02289447
- 1157 Howard, G. S. (1982). Improving methodology via research on research methods. *Journal of*
1158 *Counseling Psychology*, 29(3), 318–326. doi:10.1037/0022-0167.29.3.318
- 1159 Howard, J. L., Gagné, M., Morin, A. J., & Forest, J. (Accepted 23 March, 2016). Using
1160 Bifactor Exploratory Structural Equation Modeling to Test for a Continuum Structure
1161 of Motivation. *Journal of Management*. doi:10.1177/0149206316645653

- 1162 Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure
1163 analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*,
1164 6, 1–55. doi:10.1080/10705519909540118
- 1165 Humphrey, N., Kalambouka, A., Wigelsworth, M., Lendrum, A., Deighton, J., & Wolpert, M.
1166 (2011). Measures of social and emotional skills for children and young people: A
1167 systematic review. *Educational and Psychological Measurement*, 71(4), 617–637.
1168 doi:10.1177/0013164410382896
- 1169 Hutcheson, G. D., & Sofroniou, N. (1999). *The multivariate social scientist: Introductory*
1170 *statistics using generalized linear models*. London, UK: Sage.
1171 doi:10.4135/9780857028075
- 1172 IBM Corp. (2010). SPSS Statistics for Windows (Version 19.0). Armonk, NY: IBM Corp.
- 1173 Inoue, Y., Wegner, C. E., Jordan, J. S., & Funk, D. C. (2015). Relationships between self-
1174 determined motivation and developmental outcomes in sport-based positive youth
1175 development. *Journal of Applied Sport Psychology*, 27, 371–383.
1176 doi:10.1080/10413200.2015.1010662
- 1177 Jackson, D. L., Gillaspay Jr., J. A., & Purc-Stephenson, R. (2009). Reporting practices in
1178 confirmatory factor analysis: An overview and some recommendations. *Psychological*
1179 *Methods*, 14(1), 6–23. doi:10.1037/a0014694
- 1180 John, O. P., & Benet-Martínez, V. (2000). Measurement: Reliability, construct validation,
1181 and scale construction. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research*
1182 *methods in social and personality psychology* (pp. 339–369). New York, NY:
1183 Cambridge University Press.
- 1184 Johnston, J., Harwood, C., & Minniti, A. M. (2013). Positive youth development in
1185 swimming: Clarification and consensus of key psychosocial assets. *Journal of Applied*
1186 *Sport Psychology*, 25(4), 392–411. doi:10.1080/10413200.2012.747571

- 1187 Jones, M. L., Dunn, J. G., Holt, N. L., Sullivan, P. J., & Bloom, G. A. (2011). Exploring the
1188 '5Cs' of positive youth development in sport. *Journal of Sport Behavior*, 34(3), 250–
1189 267.
- 1190 Jöreskog, K. G., & Sörbom, D. (2003). *LISREL 8.54: Structural equation modeling with the*
1191 *Simplis command language*. Lincolnwood, IL: Scientific Software International.
- 1192 Judge, T. A., Bono, J. E., Erez, A., & Locke, E. A. (2005). Core self-evaluations and job and
1193 life satisfaction: The role of self-concordance and goal attainment. *The Journal of*
1194 *Applied Psychology*, 90(2), 257–268. doi:10.1037/0021-9010.90.2.257
- 1195 Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational*
1196 *and Psychological Measurement*, 20, 141–151. doi:10.1177/001316446002000116
- 1197 Kelloway, K. E. (1995). Structural equation modeling in perspective. *Journal of*
1198 *Organizational Behavior*, 16, 215–224. doi:10.1002/job.4030160304
- 1199 King, P. E., Schultz, W., Mueller, R. A., Dowling, E. M., Osborn, P., Dickerson, E., & Lerner,
1200 R. M. (2005). Positive youth development: Is there a nomological network of
1201 concepts used in the adolescent development literature? *Applied Developmental*
1202 *Psychology*, 9(4), 216–228. doi:10.1207/s1532480xads0904_4
- 1203 Kline, P. (2000). *A psychometrics primer*. London, UK: Free Association Books. doi:
1204 10.1007/BF02296338
- 1205 Larson, R. W. (2000). Toward a psychology of positive youth development. *American*
1206 *Psychologist*, 55(1), 170–183. doi:10.1037/0003-066X.55.1.170
- 1207 Locke, E. A., & Latham, G. P. (1984). *Goal setting: A motivational technique that works!*
1208 Englewood Cliffs, NJ: Prentice Hall. PMCID:PMC1454867
- 1209 Lonsdale, C., Hodge, K., & Rose, E. A. (2008). The Behavioral Regulation in Sport
1210 Questionnaire (BRSQ): Instrument development and initial validity evidence. *Journal*
1211 *of Sport & Exercise Psychology*, 30, 323–355. PMID:18648109

- 1212 MacCallum, R. C. (1995). Model specification: Procedures, strategies, and related issues. In
1213 R. H. Hoyle (Ed.), *Structural equation modeling: Concepts, issues, and applications*
1214 (pp. 16–36). Thousand Oaks, CA: Sage.
- 1215 MacDonald, D. J., Côté, J., Eys, M., Deakin, J. (2012). Psychometric properties of the youth
1216 experience survey with young athletes. *Psychology of Sport and Exercise, 13*, 332–
1217 340. doi:10.1016/j.psychsport.2011.09.001
- 1218 MacKenzie, S. B., Podsakoff, P. M., & Podsakoff, N. P. (2011). Construct measurement and
1219 validation procedures in MIS and behavioral research: Integrating new and existing
1220 techniques. *Management Information Systems Quarterly, 35*(2), 293–334.
- 1221 Marsh, H. W. (1992). Extracurricular activities: Beneficial extension of the traditional
1222 curriculum or subversion of academic goals? *Journal of Educational Psychology,*
1223 *84*(4), 553–562. doi:10.1037/0022-0663.84.4.553
- 1224 Marsh, H. W., Lüdtke, O., Muthén, B., Asparouhov, T., Morin, A. J., Trautwein, U., &
1225 Nagengast, B. (2010). A new look at the big five factor structure through exploratory
1226 structural equation modeling. *Psychological Assessment, 22*(3), 471–491. doi:
1227 10.1037/a0019227
- 1228 Marsh, H. W., Morin, A. J., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation
1229 modeling: An integration of the best features of exploratory and confirmatory factor
1230 analyses. *Annual Review of Clinical Psychology, 10*, 85–110. doi:10.1146/annurev-
1231 clinpsy-032813-153700
- 1232 Marsh, H. W., Muthén, B., Asparouhov, T., Lüdtke, O., Robitzsch, A., Morin, A. J., &
1233 Trautwein, U. (2009). Exploratory structural equation modeling, integrating CFA and
1234 EFA: Application to students' evaluations of university teaching. *Structural Equation*
1235 *Modeling: A Multidisciplinary Journal, 16*(3), 439–476. doi:
1236 10.1080/10705510903008220

- 1237 Marsh, H. W., Nagengast, B., & Morin, A. J. (2013). Measurement invariance of big-five
1238 factors over the life span: ESEM tests of gender, age, plasticity, maturity, and La
1239 Dolce Vita effects. *Developmental Psychology*, 49, 1194–1218.
1240 doi:10.1037/a0026913
- 1241 Mitchell, M., & Jolley, J. (2001). *Research design explained* (4th ed.). Belmont, CA:
1242 Wadsworth-Thomson Learning.
- 1243 Morin, A. J., Arens, A. K., & Marsh, H. W. (2016). A bifactor exploratory structural equation
1244 modeling framework for the identification of distinct sources of construct-relevant
1245 psychometric multidimensionality. *Structural Equation Modeling: A Multidisciplinary*
1246 *Journal*, 23(1), 116–139. doi:10.1080/10705511.2014.961800
- 1247 Morin, A. J., & Mañano, C. (2011). Cross-validation of the short form of the physical self-
1248 inventory (PSI-S) using exploratory structural equation modeling (ESEM).
1249 *Psychology of Sport and Exercise*, 12, 540–554.
1250 doi:10.1016/j.psychsport.2011.04.003
- 1251 Morin, A. J., Marsh, H. W., & Nagengast, B. (2013). Exploratory structural equation
1252 modeling. In Hancock, G. R. & Mueller, R. O. (Eds.). *Structural equation modeling:*
1253 *A second course* (2nd ed., pp. 395–436). Charlotte, NC: Information Age Publishing,
1254 Inc.
- 1255 Muthén, L. K., & Muthén, B. O. (1998 –2015). *Mplus user's guide* (7th ed.). Los Angeles,
1256 CA: Muthén & Muthén. Retrieved from <http://www.statmodel.com/ugexcerpts.shtml>
- 1257 Myers, N. D. (2013). Coaching competency and (exploratory) structural equation modeling:
1258 A substantive-methodological synergy. *Psychology of Sport and Exercise*, 14, 709–
1259 718. doi:10.1016/j.psychsport.2013.04.008
- 1260

- 1261 Myers, N. D., Ahn, S., & Jin, Y. (2011). Sample size and power estimates for a confirmatory
1262 factor analytic model in exercise and sport: A Monte Carlo approach. *Research*
1263 *Quarterly for Exercise and Sport*, 82(3), 412–423.
1264 doi:10.1080/02701367.2011.10599773
- 1265 Myers, N. D., Martin, J. J., Ntoumanis, N., Celimli, S., & Bartholomew, K. J. (2014).
1266 Exploratory bifactor analysis in sport, exercise, and performance psychology: A
1267 substantive-methodological synergy. *Sport, Exercise, and Performance Psychology*,
1268 3, 258–272. doi:10.1037/spy0000015
- 1269 Ntoumanis, N., Mouratidis, T., Ng, J., & Viladrich, C. (2015). Advances in quantitative
1270 analyses and their implications for sport and exercise psychology research. In S.
1271 Hanton & S. D. Mellalieu (Eds.), *Contemporary advances in sport psychology: A*
1272 *review*. (pp. 226–257). London, UK: Routledge.
- 1273 Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory*. New York, NY: McGraw-
1274 Hill.
- 1275 Park, N. (2004). The role of subjective well-being in positive youth development. *The Annals*
1276 *of the American Academy of Political and Social Science*, 591(1), 25–39.
1277 doi:10.1177/0002716203260078
- 1278 Pope, J. P., & Hall, C. R. (2014). Initial development of the Coach Identity Prominence
1279 Scale: A role identity model perspective. *Journal of Sport & Exercise Psychology*,
1280 36(3), 244–257. doi: 10.1123/jsep.2013-0039
- 1281 Reise, S. P. (2012). The rediscovery of bifactor measurement models. *Multivariate*
1282 *Behavioral Research*, 47, 667–696. doi:10.1080/00273171.2012.715555
- 1283 Reise, S. P., Waller, N. G., & Comrey, A. L. (2000). Factor analysis and scale revision.
1284 *Psychological Assessment*, 12(3), 287–297. doi:10.1037/1040-3590.12.3.287

- 1285 Revelle, W., & Wilt, J. (2013). The general factor of personality: A general critique. *Journal*
1286 *of Research in Personality*, 47, 493–504. doi: 10.1016/j.jrp.2013.04.012
- 1287 Rubin, R. B., & Morreale, S. P. (1996). Setting expectations for speech communication and
1288 listening. In E. A. Jones (Ed.), *Preparing competent college graduates: Setting new*
1289 *and higher expectations for student learning. New directions for higher education*
1290 (Vol. 96, pp. 19–29). San Francisco, CA: Jossey-Bass. doi:10.1002/he.36919969604
- 1291 Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic
1292 motivation, social development, and well-being. *American Psychologist*, 55(1), 68–
1293 78. doi:10.1037/0003-066X.55.1.68
- 1294 Schutz, R. W. (1994). Methodological issues and measurement problems in sport psychology.
1295 In S. Serpa, J. Alves, & V. Pataco (Eds.), *International perspectives on sport and*
1296 *exercise psychology* (pp. 35–57). Morgantown, WV: Fitness Information Technology.
1297 PMID:7734789
- 1298 Schwartz, G. (1978). Estimating the dimension of a model. *The Annals of Statistics*, 6, 461–
1299 464. doi:10.1214/aos/1176344136
- 1300 Schweizer, G., & Furley, P. (2016). Reproducible research in sport and exercise psychology:
1301 The role of sample sizes. *Psychology of Sport and Exercise*, 23, 114–122.
1302 doi:10.1016/j.psychsport.2015.11.005
- 1303 Sclove, L. (1987). Application of model-selection criteria to some problems in multivariate
1304 analysis. *Psychometrika*, 52, 333–343. doi:10.1007/BF02294360
- 1305 Smith, A., Ntoumanis, N., & Duda, J. (2007). Goal striving, goal attainment, and wellbeing:
1306 Adapting and testing the self-concordance model in sport. *Journal of Sport &*
1307 *Exercise Psychology*, 29, 763–782. PMID:18089903
- 1308

- 1309 Standage, M., & Gillison, F. (2007). Students' motivational responses toward school physical
1310 education and their relationship to general self-esteem and health-related quality of
1311 life. *Psychology of Sport and Exercise*, 8(5), 704–721.
1312 doi:10.1016/j.psychsport.2006.12.004
- 1313 Stanton, J. M., Sinar, E. F., Balzer, W. K., & Smith, P. C. (2002). Issues and strategies for
1314 reducing the length of self-report scales. *Personnel Psychology*, 55(1), 167–194.
1315 doi:10.1111/j.1744-6570.2002.tb00108.x
- 1316 Stieger, J. H., & Lind, J. M. (1980). *Statistically based tests for the number of common*
1317 *factors*. Paper presented at the annual meeting of the Psychometric Society, Iowa
1318 City, IA. PMid:7421032
- 1319 Strachan, L., Côté, J., & Deakin, J. (2009). An evaluation of personal and contextual factors
1320 in competitive youth sport. *Journal of Applied Sport Psychology*, 21(3), 340–355.
1321 doi:10.1080/10413200903018667
- 1322 Strachan, L., Côté, J., & Deakin, J. (2011). A new view: Exploring positive youth
1323 development in elite sport contexts. *Qualitative Research in Sport, Exercise and*
1324 *Health*, 3(1), 9–32. doi:10.1080/19398441.2010.541483
- 1325 Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston,
1326 MA: Pearson Education Inc. PMCID:PMC2724990
- 1327 Theokas, C., Danish, S., Hodge, K., Heke, I., & Forneris, T. (2008). Enhancing life skills
1328 through sport for children and youth. In N. L. Holt (Ed.), *Positive youth development*
1329 *through sport* (pp. 71–81). New York, NY: Routledge.
- 1330 Tomás, I., Marsh, H. W., González-Romá, V., Valls, V., & Nagengast, B. (2014). Testing
1331 measurement invariance across Spanish and English versions of the physical self-
1332 description questionnaire: An application of exploratory structural equation modeling.
1333 *Journal of Sport & Exercise Psychology*, 36(2), 179–188. doi:10.1123/jsep.2013-0070

- 1334 Tucker, L. R., & Lewis, C. (1973). A reliability coefficient for maximum likelihood factor
1335 analyses. *Psychometrika*, 38, 1–10. doi:10.1007/BF02291170
- 1336 Vaughn, B. K., Lee, H. Y., & Kamata, A. (2012). Reliability. In G. Tenenbaum, R. C.
1337 Eklund, & A. Kamata (Eds.), *Measurement in sport and exercise psychology* (pp. 25–
1338 32). Champaign, IL: Human Kinetics. PMid:22330864
- 1339 Vella, S. A., Oades, L. G., & Crowe, T. P. (2013). The relationship between coach leadership,
1340 the coach–athlete relationship, team success, and the positive developmental
1341 experiences of adolescent soccer players. *Physical Education and Sport Pedagogy*,
1342 18(5), 549–561. doi:10.1080/17408989.2012.726976
- 1343 Watson, D., & Clark, L. A. (1997). Measurement and mismeasurement of mood: Recurrent
1344 and emergent issues. *Journal of Personality Assessment*, 68, 267–296.
1345 doi:10.1207/s15327752jpa6802_4
- 1346 Weir, J. P. (2005). Quantifying test-retest reliability using the intraclass correlation
1347 coefficient and the SEM. *The Journal of Strength and Conditioning Research*, 19(1),
1348 231–240. PMid:15705040
- 1349 Wiersma, L. D. (2001). Conceptualization and development of the sources of enjoyment in
1350 youth sport questionnaire. *Measurement in Physical Education and Exercise Science*,
1351 5(3), 153–177. doi:10.1207/S15327841MPEE0503_3
- 1352 World Health Organization. (1999). *Partners in life skills education: Conclusions for a*
1353 *United Nations inter-agency meeting*. Retrieved from the World Health Organisation
1354 website: http://www.who.int/mental_health/media/en/30.pdf
- 1355 Zhu, W. (2012). Measurement practice in sport and exercise psychology: A historical,
1356 comparative, and psychometric view. In G. Tenenbaum, R. C. Eklund, & A. Kamata
1357 (Eds.), *Measurement in sport and exercise psychology* (pp. 9–21). Champaign, IL:
1358 Human Kinetics. PMCID:PMC3746351

Table 1

Number of Items, Mean Scores, Standard Deviations and Alpha Coefficients Across the Four Studies

Life Skill/s	<u>Study 1 (N = 39)</u>		<u>Study 2 (N = 338)</u>				<u>Study 3 (N = 223)</u>				<u>Study 4 (N = 37)</u>						
	Stage 1 ^a	Stage 2 ^b									Time 1				Time 2		
	Items	Items	Items	M	SD	α	Items	M	SD	α	Items	M	SD	α	M	SD	α
Full scale	270	144	47				43				43						
Teamwork	43	23	7	3.98	0.71	.84	7	4.08	0.61	.78	7	3.96	0.73	.85	4.05	0.77	.92
Goal setting	29	14	7	3.81	0.83	.89	7	3.67	0.95	.92	7	3.67	0.98	.93	3.65	1.11	.96
Time mgmt.	26	12	4	3.48	1.03	.89	4	3.41	1.01	.88	4	3.39	0.98	.90	3.34	1.03	.93
Emotional skills	41	26	8	3.63	0.83	.89	4	3.68	0.88	.83	4	3.73	0.72	.70	3.86	0.68	.78
Communication	35	13	4	4.06	0.84	.88	4	4.07	0.76	.83	4	4.14	0.78	.84	4.24	0.66	.85
Social skills	36	18	5	3.98	0.80	.85	5	3.99	0.82	.86	5	3.95	0.74	.83	3.97	0.77	.90
Leadership	31	23	8	3.92	0.78	.92	8	3.97	0.68	.89	8	3.96	0.72	.91	3.87	0.78	.94
Problem solving	29	15	4	3.67	0.92	.88	4	3.61	0.92	.89	4	3.52	0.93	.90	3.48	0.80	.89

Note. No means, standard deviations or alpha coefficients are provided in Study 1 as the scale was being developed during this study.

^aPrior to the expert review process. ^bAfter the expert review process.

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Table 2

Factor Loadings for the Life Skills Scale for Sport Items

Factors and Items	Study 2 (<i>N</i> = 338) EFA Factor Loadings ^a	Study 3 (<i>N</i> = 223) CFA Factor Loadings ^a
Teamwork		
Accept suggestions for improvement from others	.44	.22
Help build team/group spirit	.73	.69
Work well within a team/group	.75	.75
Suggest to team/group members how they can improve their performance	.69	.54
Help another team/group member perform a task	.70	.45
Change the way I perform for the benefit of the team/group	.73	.66
Work with others for the good of the team/group	.74	.71
Goal setting		
Set goals so that I can stay focused on improving	.68	.73
Set challenging goals	.77	.80
Check progress towards my goals	.75	.78
Set short-term goals in order to achieve long-term goals	.77	.83
Remain committed to my goals	.81	.80
Set goals for practice	.82	.81
Set specific goals	.76	.80
Time management		
Manage my time well	.84	.82
Assess how much time I spend on various activities	.82	.83
Control how I use my time	.85	.86
Set goals so that I use my time effectively	.82	.73
Emotional skills		
Know how to deal with my emotions	.67	.71
Understand that I behave differently when emotional	.66	.64
Notice how I feel	.71	.73
Use my emotions to stay focused	.76	.72

Understand other peoples' emotions	.71	.73
Notice how other people feel	.75	.74
Help others use their emotions to stay focused	.81	.72
Help other people control their emotions when something bad happens	.80	.73
Interpersonal communication		
Speak clearly to others	.78	.84
Pay attention to what someone is saying	.80	.72
Pay attention to peoples' body language	.75	.75
Communicate well with others	.80	.67
Social skills		
Interact in various social settings	.77	.73
Maintain close friendships	.72	.70
Start a conversation	.77	.84
Get involved in group activities	.78	.75
Help others without them asking for help	.67	.70
Leadership		
Set high standards for the team/group	.78	.73
Know how to motivate others	.77	.79
Help others solve their performance problems	.77	.72
Be a good role model for others	.76	.72
Organise team/group members to work together	.77	.74
Recognise other peoples' achievements	.73	.59
Know how to positively influence a group of individuals	.81	.73
Consider the individual opinions of each team/group member	.76	.65
Problem solving and decision making		
Think carefully about a problem	.77	.82
Create as many possible solutions to a problem as possible	.81	.89
Compare each possible solution in order to find the best one	.82	.86
Evaluate a solution to a problem	.79	.74

Note. All factor loadings are standardized.

^aFactor loadings for items within their life skill subscale.

Table 3
Indices of Model Fit for the Life Skills Scale for Sport

Model	χ^2	df	χ^2 / df	RMSEA	CFI	TLI	AIC	BIC	ABIC
Teamwork	19.67	14	1.41	.04 (.00, .08) ^c	.98	.98	3843	3915	3848
Goal setting	23.48	14	1.68	.06 (.00, .09)	.99	.99	3888	3960	3893
Time management	3.57	2	1.79	.06 (.00, .16)	1.00	.99	2355	2396	2358
Emotional skills	127.35***	20	6.37	.16 (.13, .18)	.88	.83	4556	4638	4562
My emotions ^a	2.49	2	1.25	.03 (.00, .14)	1.00	1.00	2376	2417	2379
Others' emotions ^a	21.04***	2	10.52	.21 (.13, .29)	.95	.84	2299	2340	2302
Communication	.25	2	.13	.00 (.00, .07)	1.00	1.02	2093	2134	2096
Social skills	4.66	5	.93	.00 (.00, .09)	1.00	1.00	2766	2817	2770
Leadership	44.22**	20	2.21	.07 (.04, .10)	.97	.96	3968	4050	3974
Problem solving	2.21	2	1.11	.02 (.00, .14)	1.00	1.00	2109	2150	2112
CFA – Eight-factor model ^b	1341.12***	832	1.61	.05 (.05, .06)	.91	.90	22523	23057	22560
CFA – Second-order model ^b	1434.83***	852	1.68	.06 (.05, .06)	.90	.89	22576	23043	22609
CFA – First-order model ^b	2916.02***	860	3.39	.10 (.10, .11)	.63	.62	24041	24481	24072
CFA – Bifactor model ^b	1335.84***	817	1.64	.05 (.05, .06)	.91	.90	22547	23133	22588
ESEM ^b	852.22***	587	1.45	.05 (.04, .05)	.95	.93	22524	23893	22619
H-ESEM ^b	853.83***	607	1.41	.04 (.04, .05)	.95	.92	22512	23813	22603
ESEM – Bifactor model ^b	865.41***	552	1.57	.05 (.04, .06)	.93	.89	22513	24002	22617

Note. $N = 223$. RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; AIC = Akaike information criterion; BIC = Bayesian information criterion; ABIC = Sample size adjusted BIC.

* $p < .05$. ** $p < .01$. *** $p < .001$.

^aThese two aspects of emotional skills were tested after obtaining less than adequate fit indices for the overall emotional skills subscale.

^b43-item models after the removal of the others' emotions items.

^c90 percent confidence intervals for RMSEA values.

Supplementary Materials

Table A
Selected Definitions and Components for the Life Skills

Life Skill	Definition	Components
Teamwork	“people working together to achieve something beyond the capabilities of individuals working alone” (Marks, Mathieu, & Zaccaro, 2001, p. 356)	<ol style="list-style-type: none"> 1. Providing suggestions or criticisms 2. Accepting suggestions or criticisms 3. Cooperation 4. Coordination 5. Team spirit and morale 6. Adaptability (Morgan, Glickman, Woodward, Blaiwes, & Salas, 1986)
Goal setting	“the process by which people establish desirable objectives for their actions” (Moran, 2004, p. 55)	<ol style="list-style-type: none"> 1. Make goals specific and measurable 2. Identify time constraints 3. Use moderately difficult goals 4. Write goals down and monitor progress 5. Use a mix of process, performance, and outcome goals 6. Use short-range goals to achieve long-range goals 7. Set goals for practice and competition 8. Make sure goals are internalised by the athlete (Cox, 2012)
Time management	“behaviours that aim at achieving an effective use of time while performing certain goal-directed activities” (Claessens, van Eerde, Rutte, & Roe, 2007, p. 262)	<ol style="list-style-type: none"> 1. Time assessment 2. Planning 3. Monitoring (Claessens et al., 2007)
Emotional skills ^a	“the processes involved in the recognition, use, understanding, and management of one’s own and others emotional states” (Salovey, Brackett, & Mayer, 2004, p. i)	<ol style="list-style-type: none"> 1. Perception of emotions 2. Use of emotions 3. Understanding of emotions 4. Management of emotions (Latimer et al., 2007)

Interpersonal communication	“the process by which people exchange information, feelings, and meaning through verbal and non-verbal messages: it is face-to-face communication” (Interpersonal Communication Skills, 2011)	<ol style="list-style-type: none"> 1. Speaking 2. Listening 3. Non-verbal communication (Dunbar, Brooks, & Kubicka-Miller, 2006; Henry, Reed, & McAllister, 1995)
Social skills	“learned behaviours that allow one to interact and function effectively in a variety of social contexts” (Sheridan & Walker, 1999, p. 687)	<ol style="list-style-type: none"> 1. Social assertiveness 2. Performance in public situations 3. Participation in social groups 4. Friendship and intimacy 5. Giving or receiving help (Smith & Betz, 2000)
Leadership	“process whereby an individual influences a group of individuals to achieve a common goal” (Northouse, 2010, p. 3)	<ol style="list-style-type: none"> 1. Individual consideration 2. Inspirational motivation 3. Intellectual stimulation 4. Fostering acceptance of team goals and promoting teamwork 5. High performance expectations 6. Appropriate role modeling 7. Contingent reward (Callow, Smith, Hardy, Arthur, & Hardy, 2009)
Problem Solving and Decision Making	“the activities by which a person attempts to understand problems in everyday living and to discover effective solutions” (D’Zurilla & Nezu, 2010, p. 200)	<ol style="list-style-type: none"> 1. Problem definition and formulation 2. Generation of alternative solutions 3. Decision making 4. Solution implementation and verification (D’Zurilla & Goldfried, 1971)

^aAs emotional skills involves dealing with one’s own and other’s emotional states, there were eight components of emotional skills which dealt with: perception of my emotions, perception of other’s emotions, use of my emotions, use of other’s emotions, understanding of my emotions, understanding of other’s emotions, management of my emotions, and management of other’s emotions.

References for Table A

- Callow, N., Smith, M., Hardy, L., Arthur, C. A., & Hardy, J. (2009). Measurement of transformational leadership and its relationship with team cohesion and performance level. *Journal of Applied Sport Psychology*, 21, 395–412.
doi:10.1080/10413200903204754
- Claessens, B. J., van Eerde, W., Rutte, C. G., & Roe, R. A. (2007). A review of time management literature. *Personnel Review*, 36(2), 255–276.
doi:10.1108/00483480710726136
- Cox, R. H. (2012). *Sport psychology: Concepts and applications* (7th ed.). New York, NY: McGraw-Hill.
- Dunbar, N. E., Brooks, C. F., & Kubicka-Miller, T. (2006). Oral communication skills in higher education: Using a performance-based evaluation rubric to assess communication skills. *Innovative Higher Education* 31(2) 115–128.
doi:10.1007/s10755-006-9012-x
- D’Zurilla, T. J., & Goldfried, M. R. (1971). Problem solving and behavior modification. *Journal of Abnormal Psychology*, 78(1), 107–126. doi:10.1037/h0031360
- D’Zurilla, T. J., & Nezu, A. M. (2010). Problem-solving therapy. In K. S. Dobson (Ed.), *Handbook of cognitive-behavioral therapies* (pp. 197–225). New York, NY: Guilford Publications.
- Henry, F. M., Reed, V. A., & McAllister, L. L. (1995). Adolescents’ perceptions of the relative importance of selected communication skills in their positive peer relationships. *Language, Speech, and Hearing Services in Schools*, 26(3), 263–272.
doi:10.1044/0161-1461.2603.263

Interpersonal Communication Skills. (2011). *Skills you need: Helping you develop life skills*.

Retrieved from the Skills You Need website:

http://www.skillsyouneed.co.uk/IPS/Interpersonal_Communication.html

Latimer, A. E., Rench, T. A., & Brackett, M. A. (2007). Emotional intelligence: A framework for examining emotions in sport and exercise groups. In M. R. Beauchamp & M. A. Eys (Eds.), *Group dynamics in exercise and sport psychology: Contemporary themes* (pp. 3–24). Oxon, UK: Routledge.

Marks, M. A., Mathieu, J. E., & Zaccaro, S. J. (2001). A temporally based framework and taxonomy of team processes. *Academy of Management Review*, 26(3), 356–376. doi: 10.2307/259182

Moran, A. P. (2004). *Sport and exercise psychology: A critical introduction*. East Sussex, UK: Routledge. doi:10.4324/9780203380246

Morgan, B. B., Glickman, A. S., Woodward, E. A., Blaiwes, A. S., & Salas, E. (1986). *Measurement of team behaviors in a navy environment* (Technical report, Contract DAH 19-78-C-0001). Retrieved from Online Information for the Defence Community website: <http://oai.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA185237>

Northouse, P. (2010). *Leadership: Theory and practice*. London, UK: Sage.

Salovey, P., Brackett, M., & Mayer, J. (2004). *Emotional intelligence: Key readings on the Mayer and Salovey model*. New York, NY: National Professional Resources Inc. doi:10.1017/cbo9780511806582.019

Sheridan, S. M., & Walker, D. (1999). Social skills in context: Considerations for assessment, intervention, and generalization. In C. R. Reynolds & T. B. Gutkin (Eds.), *The handbook of school psychology* (3rd ed., pp. 686–708). New York, NY: Wiley and Sons.

Smith, H. M., & Betz, N. E. (2000). Development and validation of a scale of perceived social self-efficacy. *Journal of Career Assessment*, 8(3), 283–301.

doi:10.1177/106907270000800306

Table B

EFA Results for Each Subscale of the Life Skills Scale for Sport

Subscale & Factors	Eigenvalue from real dataset	Percentage of variance explained	Average eigenvalue from parallel analysis	95th percentile eigenvalue from parallel analysis
Teamwork				
1	8.87	38.55	1.51	1.59
2	2.01	8.74	1.42	1.48
3	1.39	6.06	1.35	1.41
4	1.32	5.75	1.30	1.34
Goal Setting				
1	7.60	54.27	1.36	1.44
2	1.14	8.11	1.27	1.33
Time Management				
1	7.05	58.78	1.32	1.40
Emotional Skills				
1	12.47	47.97	1.55	1.62
2	1.50	5.78	1.46	1.52
3	1.07	4.13	1.40	1.45
Communication				
1	7.44	57.20	1.34	1.42
2	1.01	7.74	1.25	1.32
Social Skills				
1	8.95	49.73	1.42	1.50
2	1.33	7.41	1.34	1.40
Leadership				
1	12.75	55.43	1.51	1.59
2	1.02	4.44	1.42	1.48
Problem Solving				
1	9.00	60.00	1.38	1.46
2	1.03	6.83	1.29	1.35

Note. During parallel analysis 1,000 random datasets were generated. Only factors with eigenvalues above 1.0 are displayed.

Table C

Comparison Table for Social Skills Items

Component	Item #	Item	FL	CL	Mean	SD	Skewness	Kurtosis
FI	1	Make friends	.73	Yes	4.29	0.94	-1.31	1.23
PPS	2	Behave appropriately in social situations	.64	Yes	4.04	0.98	-1.07	1.01
PSG	3	Participate in social groups	.77	No	4.11	1.00	-1.10	0.85
SA	4	Introduce myself to others	.68	Yes	4.09	1.00	-1.06	0.61
H	5	Ask for help when I need it	.68	Yes	3.90	1.01	-0.74	-0.02
PPS	6	Interact in various social settings	.77	No	3.93	0.94	-0.63	0.04
SA	7	Arrange to meet with others	.71	No	3.78	1.15	-0.61	-0.61
PPS	8	Get others to laugh	.69	No	4.14	1.02	-1.09	0.54
SA	9	Join in on a conversation	.77	No	4.21	0.93	-1.13	0.85
FI	10	Maintain close friendships	.72	No	4.10	1.00	-1.13	0.91
H	11	Help others when they need it	.66	No	4.11	0.86	-0.81	0.35
SA	12	Start a conversation	.77	No	3.94	1.10	-0.91	0.09
PPS	13	Conduct myself properly when I am around others	.67	No	3.98	0.99	-0.94	0.64
PSG	14	Get involved in group activities	.78	No	4.11	0.97	-0.98	0.44
FI	15	Talk to friends about personal things	.61	Yes	3.46	1.32	-0.45	-0.86
H	16	Help others without them asking for help	.67	No	3.85	1.05	-0.86	0.33
SA	17	Stand up for myself	.59	No	4.21	0.94	-1.13	0.85
PSG	18	Socialise with others	.76	No	4.24	0.92	-1.22	1.21

Note. Items selected are in boldface. FI = Friendship and intimacy; PPS = Performance in public situations; PSG = Participation in social groups; SA = Social assertiveness; H = Helping behavior; FL = Factor Loading; CL = Cross loading.

Table D
Pattern Matrix for the Full 47-Item Scale

Item #	<u>Factor</u>							
	1	2	3	4	5	6	7	8
TW2								<u>.30</u>
TW5			.63					
TW7			.76					
TW8			.70					
TW11			.73					
TW13			.68					
TW18			.69					
GS1		.68						
GS4		.80						
GS6		.62						
GS7		.69						
GS8		.76						
GS9		.75						
GS14		.81						
SS6							-.43	
SS10							-.62	
SS12							-.75	
SS14							-.69	
SS16							-.51	
TM4						-.79		
TM5						-.88		
TM7						-.84		
TM10						-.73		
ES4				.63				
ES6				.62				
ES8				.70				
ES10				.72				
ES16				.52				
ES20				.50				
ES21				.62				
ES26	<u>.33</u>			.45				
LS6	.57							
LS10	.75							
LS11	.73							
LS12	.69							
LS13	.68							
LS15	.72							
LS16	.80							
LS17	.70							

PS1	<u>-.37</u>	-.54
PS2	<u>-.36</u>	-.57
PS3		-.53
PS9		-.40
CS1	-.72	
CS2	-.77	
CS3	-.67	
CS4	-.72	

Note. Exploratory factor analysis was conducted with a oblique (direct oblimin; $\delta = 0$) rotation. Coefficients $< .30$ were suppressed and all cross loadings are underlined. TW = Teamwork; GS = Goal setting; TM = Time management; ES = Emotional skills; CS = Communication skills; SS = Social skills; LS = Leadership skills; PS = Problem solving & decision making.

Table E

Standardized Factor Loadings and Uniqueness of Items for all CFA Models

Item	Eight-Factor Model		Second-Order Model		First-Order Model		Bifactor Model		
	FL	Uniqueness	FL	Uniqueness	FL	Uniqueness	Specific FL	General FL	Uniqueness
TW2	.26***	.93***	.24**	.94***	.28***	.92***	.07	.27***	.92***
TW5	.70***	.51***	.69***	.53***	.44***	.81***	.54***	.42***	.53***
TW7	.73***	.46***	.73***	.47***	.42***	.83***	.63***	.41***	.44***
TW8	.57***	.68***	.57***	.68***	.47***	.78***	.34***	.46***	.68***
TW11	.46***	.79***	.47***	.78***	.34***	.88***	.30***	.34***	.79***
TW13	.64***	.59***	.65***	.58***	.39***	.85***	.54***	.38***	.57***
TW18	.69***	.52***	.70***	.51***	.44***	.81***	.58***	.41***	.49***
GS1	.74***	.46***	.73***	.46***	.56***	.69***	.54***	.50***	.47***
GS4	.80***	.36***	.80***	.36***	.60***	.64***	.59***	.55***	.36***
GS6	.78***	.40***	.78***	.40***	.54***	.71***	.63***	.47***	.38***
GS7	.83***	.32***	.82***	.32***	.59***	.65***	.64***	.52***	.32***
GS8	.79***	.37***	.80***	.37***	.55***	.70***	.64***	.49***	.36***
GS9	.81***	.34***	.81***	.34***	.62***	.62***	.58***	.57***	.34***
GS14	.80***	.36***	.80***	.36***	.65***	.58***	.54***	.60***	.36***
TM4	.81***	.35***	.82***	.33***	.57***	.67***	.62***	.53***	.33***
TM5	.84***	.29***	.84***	.29***	.65***	.58***	.56***	.62***	.30***
TM7	.84***	.29***	.84***	.30***	.57***	.67***	.68***	.53***	.26***
TM10	.76***	.43***	.74***	.45***	.63***	.61***	.46***	.58***	.45***
ES6	.78***	.40***	.77***	.42***	.64***	.59***	.41***	.63***	.44***
ES8	.71***	.49***	.72***	.49***	.55***	.70***	.55***	.54***	.41***
ES10	.76***	.43***	.76***	.42***	.59***	.65***	.52***	.60***	.38***
ES21	.70***	.51***	.71***	.50***	.66***	.57***	.22**	.66***	.52***

CS1	.81***	.34***	.81***	.34***	.66***	.57***	.53***	.66***	.29***
CS2	.70***	.51***	.71***	.50***	.59***	.65***	.41***	.58***	.49***
CS3	.77***	.41***	.77***	.41***	.66***	.57***	.34***	.67***	.43***
CS4	.70***	.52***	.69***	.53***	.61***	.63***	.28***	.61***	.54***
SS6	.75***	.44***	.75***	.44***	.63***	.60***	.38***	.64***	.46***
SS10	.71***	.50***	.70***	.51***	.55***	.70***	.44***	.54***	.51***
SS12	.81***	.34***	.81***	.34***	.60***	.64***	.62***	.58***	.27***
SS14	.74***	.45***	.74***	.46***	.54***	.71***	.54***	.52***	.44***
SS16	.71***	.49***	.72***	.48***	.62***	.61***	.35***	.62***	.49***
LS6	.73***	.47***	.72***	.48***	.66***	.56***	.38***	.63***	.45***
LS10	.77***	.41***	.77***	.41***	.66***	.57***	.51***	.64***	.34***
LS11	.72***	.48***	.73***	.47***	.69***	.52***	.25***	.69***	.46***
LS12	.72***	.48***	.72***	.48***	.64***	.59***	.35***	.63***	.48***
LS13	.73***	.47***	.74***	.46***	.66***	.57***	.38***	.63***	.46***
LS15	.60***	.64***	.60***	.64***	.54***	.71***	.24**	.53***	.66***
LS16	.74***	.45***	.74***	.46***	.68***	.54***	.28***	.67***	.47***
LS17	.67***	.56***	.66***	.56***	.61***	.62***	.22**	.61***	.58***
PS1	.83***	.31***	.83***	.32***	.73***	.46***	.38***	.72***	.34***
PS2	.86***	.26***	.87***	.25***	.72***	.48***	.56***	.71***	.19***
PS3	.85***	.28***	.85***	.28***	.72***	.48***	.47***	.71***	.27***
PS9	.77***	.41***	.77***	.41***	.73***	.47***	.23***	.73***	.41***

Note. FL = Factor Loading; TW = Teamwork; GS = Goal setting; TM = Time management; ES = Emotional skills; CS = Communication skills; SS = Social skills; LS = Leadership skills; PS = Problem solving & decision making.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table F

Standardized Factor Loadings and Uniqueness of Items for the ESEM Model

Item	TW	GS	TM	ES	CS	SS	LS	PS	Uniqueness
TW2	.10	.27**	-.05	-.01	.03	.14	.13	-.17	.85***
TW5	.50***	-.09	.04	.000	-.11	.15*	.23**	-.04	.54***
TW7	.81***	.08	-.08	-.13*	.12*	.12*	-.15*	.07	.30***
TW8	.48***	.07	.07	.13	-.25***	-.04	.20**	.03	.57***
TW11	.43***	-.004	-.04	.06	.23**	-.004	-.07	.06	.71***
TW13	.59***	-.05	.04	.10	-.14*	-.03	.20**	-.07	.56***
TW18	.55***	.07	-.03	-.01	-.05	.19*	-.05	.06	.56***
GS1	.004	.64***	.23***	.02	-.03	.004	.01	-.08	.43***
GS4	.15**	.73***	.11*	-.001	.06	-.16**	.09	-.07	.33***
GS6	.14**	.79***	.04	-.03	.02	-.10	-.10	.07	.36***
GS7	-.001	.76***	.07	.10	-.08	-.02	.01	-.01	.31***
GS8	-.05	.85***	-.12*	-.04	.03	.03	.003	.08	.33***
GS9	-.06	.77***	-.05	.04	-.06	.07	.04	.09	.32***
GS14	-.07	.71***	-.02	.05	.02	.07	.11	.04	.35***
TM4	.10*	-.06	.87***	-.13**	.11*	-.04	-.01	.07	.26***
TM5	.06	.06	.74***	.06	.05	.02	-.03	.03	.29***
TM7	-.11*	.02	.82***	.09	-.06	.04	.08	-.05	.27***
TM10	-.14*	.25***	.50***	-.01	-.07	.17**	.04	.12	.40***
ES6	.04	.14**	.10	.66***	-.06	.09	-.08	.03	.36***
ES8	-.02	-.01	-.07	.75***	.13*	-.03	.07	-.02	.41***
ES10	.04	-.02	.04	.71***	.09	.07	-.08	.04	.39***
ES21	-.01	.07	-.04	.39***	-.10	.09	.26***	.21**	.47***

CS1	-.02	-.05	.13*	.10	.55***	.04	.26***	.09	.34***
CS2	-.13*	.13*	.03	.12	.48***	.25***	.01	.08	.46***
CS3	.08	-.01	.03	.18**	.44***	-.02	.13*	.23***	.41***
CS4	.07	-.001	.03	-.08	.41***	.21**	.28***	.08	.46***
SS6	.04	-.06	-.004	.18**	.15*	.49***	.12	.04	.44***
SS10	.19**	-.07	.18**	.10	.17**	.51***	-.19**	.03	.45***
SS12	.15**	.02	.07	.08	.03	.69***	-.07	-.02	.34***
SS14	.08	-.02	-.01	-.13*	-.02	.75***	.19**	-.02	.31***
SS16	.05	.03	.04	.11	.01	.53***	.05	.09	.48***
LS6	.14*	.06	.08	.04	.04	.02	.52***	.05	.47***
LS10	.06	-.05	.02	.04	-.07	.15*	.70***	.03	.34***
LS11	.05	.02	.07	.04	-.07	.04	.47***	.29***	.43***
LS12	.06	.04	-.02	.04	-.01	.002	.55***	.19**	.47***
LS13	.01	.02	.16**	.04	.02	-.01	.59***	.05	.45***
LS15	.07	.12	.01	.09	.31***	-.04	.45***	-.17*	.56***
LS16	-.01	.14*	.003	-.06	.22***	.20**	.56***	-.04	.38***
LS17	.22***	.10	-.003	.07	.28***	-.12	.41***	.004	.50***
PS1	.07	.14**	.003	.21***	.01	.06	-.02	.56***	.32***
PS2	.05	.01	.03	-.02	.06	-.01	.03	.86***	.16***
PS3	.04	.03	.08	.05	.07	-.02	.10	.68***	.29***
PS9	-.06	.10	.17**	.05	.16**	.09	.10	.44***	.40***

Note. TW = Teamwork; GS = Goal setting; TM = Time management; ES = Emotional skills; CS = Communication skills; SS = Social skills; LS = Leadership skills; PS = Problem solving & decision making.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table G

Standardized Factor Loadings and Uniqueness of Items for the Bifactor ESEM Model

Item	TW	GS	TM	ES	CS	SS	LS	PS	General Factor	Uniqueness
TW2	.09	.21*	-.03	-.004	.06	.17	.17	-.09	.23*	.83***
TW5	.44**	-.13	-.01	-.05	-.11	.13	.17	-.07	.44***	.53***
TW7	.69***	-.04	-.09	-.10	.13	.17	-.09	.01	.41**	.28
TW8	.39***	.09	.05	.10	-.18	.07	.26	.07	.42***	.55***
TW11	.35***	-.05	-.06	.05	.22	.06	-.03	.03	.33**	.71***
TW13	.51**	-.08	-.02	.02	-.14	-.04	.07	-.11	.42***	.53***
TW18	.48*	-.05	-.06	-.06	-.07	.09	-.11	-.04	.46**	.52
GS1	-.03	.52***	.21**	.01	-.05	-.05	-.05	-.07	.50***	.42***
GS4	.08	.60***	.12	.02	.06	-.10	.09	-.03	.52***	.33***
GS6	.08	.69***	.11*	.05	.06	.01	.07	.13	.42***	.30***
GS7	-.04	.62***	.10	.09	-.09	-.05	.01	.003	.52***	.31***
GS8	-.09	.63***	-.05	-.04	-.02	-.07	-.06	.01	.51***	.33***
GS9	-.09	.58***	-.01	.02	-.10	-.03	-.03	.03	.57***	.32***
GS14	-.10	.52***	.000	.001	-.04	-.06	-.03	-.03	.61***	.34***
TM4	.04	.04	.66***	-.10	.07	-.03	-.05	.04	.54***	.26***
TM5	.01	.17**	.60***	.08	.07	.09	.07	.08	.56***	.26***
TM7	-.13*	.11*	.63***	.03	-.10	-.03	-.03	-.05	.55***	.25***
TM10	-.15*	.22**	.38***	-.05	-.13	.03	-.09	.04	.61***	.39***
ES6	-.01	.17**	.09	.49***	-.04	.08	-.04	.09	.59***	.35***
ES8	-.06	.01	-.08	.52***	.11	-.06	-.004	.02	.54***	.41***
ES10	-.02	.002	.01	.50***	.06	.01	-.12	.05	.59***	.39***
ES21	-.04	-.003	-.09	.21*	-.18	-.10	-.02	.07	.69***	.42***

CS1	-.05	-.09	.03	.04	.44***	.02	.11	.01	.66***	.34***
CS2	-.13	.02	-.02	.04	.37*	.10	-.11	-.02	.60***	.46**
CS3	.02	-.05	-.03	.12	.37**	-.01	.04	.14	.64***	.42***
CS4	.05	-.12	-.06	-.14	.29	.08	.03	-.07	.65***	.45***
SS6	.05	-.12	-.05	.08	.09	.34	.04	-.01	.64***	.44***
SS10	.17	-.08	.13	.07	.17	.45***	-.07	.04	.52***	.44***
SS12	.16	-.04	.04	.04	.02	.62**	.03	-.01	.57***	.26
SS14	.12	-.17	-.07	-.20	-.10	.45	.01	-.14	.60***	.32**
SS16	.05	-.06	-.01	.01	-.05	.33**	-.06	.000	.64***	.48***
LS6	.10	.02	.001	-.03	.000	-.01	.32*	-.01	.64***	.47***
LS10	.05	-.12*	-.08	-.10	-.15	-.01	.33	-.09	.70***	.34***
LS11	.01	-.02	.002	-.03	-.13	-.04	.24	.15	.69***	.43***
LS12	.04	.01	-.06	-.01	-.04	-.02	.38***	.11	.62***	.45***
LS13	-.01	.05	.10	.01	.02	.05	.53	.06	.60***	.34
LS15	.04	.02	-.07	-.02	.22	-.10	.15	-.22	.57**	.55**
LS16	-.01	.001	-.08	-.15	.11	.05	.24	-.14	.71***	.38***
LS17	.16*	.04	-.06	.01	.23	-.07	.25	-.03	.59***	.50***
PS1	-.01	.10	.004	.17	-.01	.01	-.01	.41***	.69***	.32***
PS2	-.03	-.02	.01	.01	.01	-.05	.001	.59***	.70***	.16*
PS3	-.04	-.01	.04	.03	.002	-.10	-.02	.44***	.71***	.29***
PS9	-.10	.07	.11	.03	.10	.04	.04	.30*	.69***	.40***

Note. TW = Teamwork; GS = Goal setting; TM = Time management; ES = Emotional skills; CS = Communication skills; SS = Social skills; LS = Leadership skills; PS = Problem solving & decision making.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table H

Standardized Factor Correlations for the CFA and ESEM Models

	TW	GS	TM	ES	CS	SS	LS	PS
CFA Model								
TW	—							
GS	.33***	—						
TM	.34***	.63***	—					
ES	.45***	.61***	.57***	—				
CS	.51***	.48***	.55***	.70***	—			
SS	.71***	.38***	.53***	.62***	.72***	—		
LS	.65***	.58***	.58***	.66***	.78***	.71***	—	
PS	.47***	.59***	.63***	.77***	.74***	.61***	.74***	—
ESEM Model								
TW	—							
GS	.22**	—						
TM	.24***	.53***	—					
ES	.29***	.48***	.42***	—				
CS	.26***	.20**	.22**	.32***	—			
SS	.49***	.28***	.38***	.38***	.33***	—		
LS	.43***	.42***	.39***	.42***	.28***	.49***	—	
PS	.28***	.41***	.44***	.56***	.27***	.39***	.49***	—

Note. TW = Teamwork; GS = Goal setting; TM = Time management; ES = emotional Skills; CS = Communication skills; SS = Social skills; LS = Leadership skills; PS = Problem solving & decision making.

* $p < .05$. ** $p < .01$. *** $p < .001$.